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No. 52

OPERATIONS AT RIVER STATIONS, 1900.—PART VI

WASHINGTON
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1901

UNITED STATES GEOLOGICAL SURVEY

CHARLES D. WALCOTT, DIRECTOR

OPERATIONS AT RIVER STATIONS, 1900

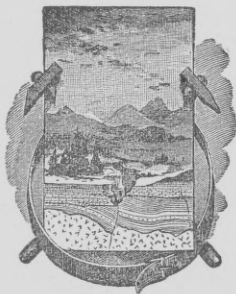
A REPORT OF THE

DIVISION OF HYDROGRAPHY

OF THE

UNITED STATES GEOLOGICAL SURVEY

PART VI



WASHINGTON

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OPERATIONS AT RIVER STATIONS, 1900.¹

PART VI.

PRECIPITATION ON MOUNTAINS IN SOUTHERN CALIFORNIA.

In order to obtain rainfall data bearing upon river discharge, a number of rainfall gages have been established at various points in the mountainous regions of California. Results obtained at these localities during 1900, together with a few figures from other sources, are given in the following tables. The first table gives the location of the rainfall stations; the second table gives the depth of rainfall, in inches, for each month of the year. Similar figures for 1896 are given on page 418 of the Eighteenth Annual Report, Part IV; for 1897, on page 539 of the Nineteenth Annual Report, Part IV; for 1898, on page 560 of the Twentieth Annual Report, Part IV; and for 1899, on page 437 of Water-Supply Paper No. 39.

Rainfall stations in southern California.

Station.	County.	Post-office.	Latitude.	Longitude.	Elevation.
			° /	° /	<i>Feet.</i>
Sisson	Siskiyou	Sisson	41 27	122 25	3,555
Dunsmuir	do .....	.....	.....	.....	.....
Delta	Shasta .....	.....	.....	.....	.....
Redding	do .....	.....	.....	.....	.....
Redbluff	Tehama	Redbluff	40 12	122 20	324
Jacinto	Glenn .....	.....	.....	.....	.....
Upper Lake	Lake .....	.....	.....	.....	.....
Sonora	Tuolumne	Sonora	38 00	120 16	1,824
Second Garrotte	do	Groveland	37 49	120 12	2,900
Crockers	do	Sequoia	37 48	119 53	4,453
Yosemite	Mariposa	Yosemite	37 45	119 35	4,063
Millwood	Fresno	Millwood .....	.....	.....	.....
Milo	Tulare	Milo	36 15	118 50	3,200
Kernville	Kern	Kernville	35 45	118 25	2,600
Isabella	do	Isabella	35 48	118 25	2,600
Taylor's ranch	do	Weldon	36 20	118 17	2,640
Mount Breckenridge	do	Bakersfield	35 25	118 35	6,750
Bear Valley	do	Tehachapi .....	.....	.....	4,000
Tejon ranch	do	Bakersfield	35 00	118 45	1,450
Fort Tejon	do	Lebec	34 53	118 53	3,245
Frazier mine	Ventura	Neenach	34 49	118 58	3,000
La Liebre	Los Angeles	do	34 46	118 40	3,170
Sneddens	Ventura	Griffin	34 41	119 03	4,900
Smith's ranch	do	Gorman	34 44	118 47	4,850
Palmdale headworks	Los Angeles	Palmdale	34 25	118 03	3,299
Mutah Flat	Ventura	Griffin	34 38	119 03	4,850
Magic Hill	Los Angeles	Burbank	34 23	118 22	2,820

¹ Continued from Water-Supply and Irrigation Paper No. 51.

Rainfall stations in southern California—Continued.

Station.	County.	Post-office.	Latitude.	Longitude.	Elevation.
			° /	° /	Feet.
Colby's camp	Los Angeles	Pasadena			3,875
Mount Sister Elsie	do	Monte Vista	34 17	118 14	5,021
Mount Lowe	do	Echo Mountain	34 15	118 07	3,200
Follows's camp	do	Azusa	34 14	117 49	1,800
Glenn ranch	San Bernardino	Cajon	34 50	117 30	3,112
Upper Holcomb	do	San Bernardino	34 18	116 50	7,200
Little Bear Valley	do	do	34 15	117 10	5,150
Morse's house	do	do	34 12	117 12	5,330
Deep Creek	do	do	34 17	117 05	5,200
Holcomb Creek	do	do	34 18	116 58	5,220
Squirrel Inn	do	do	34 12	117 12	5,300
Santa Ana River power house	do				
Mill Creek (a)	do	Redlands			5,000
Mill Creek (b)	do	do			2,915
Descanso	San Diego	Descanso	32 50	116 40	3,500
Campo	do	Campo			2,660
Laguna	do	do			5,760
Cuyamaca	do	San Diego	32 58	115 35	4,860
Sweetwater dam	do	National City	32 43	117 00	250
La Mesa					

Precipitation at rainfall stations in southern California, 1900.

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.
Sisson	8.64	1.04	9.92	3.49	2.05	1.24	0.00	0.16	0.67	10.76	4.52	3.80	46.29
Dunsmuir	9.93	3.32	6.27	4.85	3.18	.90	0.00	T.	1.20	6.13	7.16	8.29	51.23
Delta	12.25	4.60	9.45	8.59	4.10	1.56	.17	.20	.97	15.68	10.51	8.04	76.12
Redding	6.45	2.86	3.68	2.59	3.12	1.38	T.	.16	2.48	6.47	3.03	3.14	35.36
Redbluff	4.15	1.62	2.38	2.69	1.18	.94	0.00	.05	.21	3.25	3.23	2.07	21.77
Jacinto	3.06	.17	1.27	1.68	.72	0.00	0.00	0.00	0.00	2.42	5.00		
Upper Lake	3.98	1.31	3.53	2.13	.81	.35	T.	0.00	.03	3.96	5.08	3.63	24.81
Sonora	3.20	1.37	2.75	4.28	2.01	.20	0.00	.03	.14	5.10	10.29	2.05	31.42
Second Garrotte	5.25	1.25	3.75	4.00	1.50	0.00	0.00	0.00	.25	5.00	14.00	1.50	36.50
Crocker's	5.98	1.18	4.28	3.56	1.80	.47	0.00	0.00	.62	9.71	17.43	1.39	46.42
Millwood									1.50	6.70	10.37	(a)	
Kernville	.80	.53	.58	.52	.90	0.00	0.00	0.00	.79	.10	5.09	0.00	9.31
Isabella	1.10	.65	.65	.73	1.06	0.00	0.00	.02	.30	.24	5.53	.05	10.33
Taylor's ranch	.71	.47	.50	.39	.82	.02	0.00	.03	.62	.02	4.29	0.00	7.87
Bear Valley	2.77	1.34	1.00	5.05	2.47	0.00	0.00	0.00	0.00	1.76	2.71	.32	17.42
Tejon ranch	1.17	.35	.41	1.97	1.57	.02	0.00	0.00	.06	.67	1.06	.34	7.62
Fort Tejon	2.12	.66	.85	1.82	1.57	0.00	0.00	0.00	1.06	0.00	1.71	.50	10.29
Sneddens	1.40	T.	1.45	.50	1.40	0.00	0.00	0.00	0.00	0.00	4.52	0.00	9.27
Smith's ranch	1.20	0.00	1.12	.12	.75	0.00	0.00	0.00	.15	0.00	3.10	0.00	6.44
Palmdale head-works	.65	0.00	.80	.57	.76	0.00	0.00	0.00	0.00	.20	1.79	0.00	4.77
Mutah Flat	2.80	0.00	1.95	.40	1.80	0.00	0.00	0.00	0.00	0.00	5.10	0.00	12.05
Magic Hill	1.34	0.00	1.67	2.05	4.40	.06	.04	0.00	.54	.71	6.53	0.00	17.34
Colby's camp	1.15	0.00	2.00	1.38	3.25	0.00	0.00	0.00	.25	.45	8.15	0.00	16.63
Mount Sister Elsie	.85	0.00	1.87	1.30	3.02	0.00	0.00	T.	.09	.81	6.70	0.00	14.64
Mount Lowe			2.90	2.15	4.05	.40	T.	0.00	.25	1.66	11.71	0.00	
Follows's camp		T.	2.40	1.77	2.98								
Glenn ranch	2.15	.10	3.84	1.35	1.69	.02	.01	0.00	.31	.46	9.39	0.00	19.32
Little Bear Valley													
Morse's house	1.39	.43	3.42	3.11	4.63								
Deep Creek	2.20	.44	3.83	5.81	8.64								
Holcomb Creek	1.40	.28	3.07	2.70	4.75								
Squirrel Inn	.38	.21	1.14	1.25	1.20								
Santa Ana River power house	1.73	.26	3.04	4.81	6.37								
Mill Creek (a)	.10	0.00	2.38	5.49	3.70	0.00	0.00	0.00	.98	.74	8.26	0.00	21.65
Mill Creek (b)	2.52	.43	2.28	4.49							9.05		
Descanso	1.41	.07	1.43	3.74	3.31	0.00	0.00	0.00	1.14	1.15	4.96	0.00	17.21
Campo	4.00	.75	1.25	4.25	2.69	.06	0.00	T.	.25	.63	6.50	.15	20.53
Laguna	2.65	.10	.55	2.07	1.04	.10	0.00	0.00	.05	.28	4.47	0.00	11.31
Cuyamaca	3.30	.37	1.00	3.80	2.19	.30	0.00	0.00	.20	.40	6.20	0.00	17.76
Sweetwater dam	3.62	.26	2.51	6.69	2.81	.10	.28	0.00	.92	.74	11.97	.04	29.94
La Mesa	.57	0.00	.37	1.06	1.66	0.00	0.00	0.00	0.00	.25	1.63	0.00	5.54
	.97	.03	.72	1.73	1.53	T.		0.00	.01	.37	2.38	0.00	7.74

a Gage destroyed.

T indicates trace of rainfall.

CONSTRUCTION OF WELLS IN SOUTHERN CALIFORNIA.

Mr. H. N. Savage, of National City, California, states that in constructing wells in sand and small gravel he puts down a tube 3 inches in diameter, open at the bottom, the lower portion being perforated and wound with wire spaced 1 inch between coils. Around this wire is wrapped a wire gauze with 50 meshes to the lineal inch, and outside of this the wire is again wound, strips placed longitudinally to the pipe being soldered to each turn of the wire. The pipe with this perforated tube on the lower end is sunk by forcing muddy water down it, lengths being added as the pipe descends. It has been found that clear water can not be used successfully, but that a considerable amount of silt must be kept in suspension in the wash water. Presumably the sediment serves to coat the sand and prevent its adhering to the outside of the pipe.

In adding new joints to the top of the pipe, the change is made with great rapidity, so as not to shut off the wash water for more than a few seconds. If the water is stopped for a longer period the sand will settle against the pipe and prevent further progress. When the pipe has been settled into position, gravel is immediately shoveled around it, while the water is still rising on the outside. About one-half cubic yard of gravel is thus shoveled in. As soon as this is done pumping is started, to clean out the well. A centrifugal pump is used for the purpose. At first it is necessary to prime the pump often, sometimes every few minutes. Pumping is continued until the sand is exhausted—sometimes several days or a week is required to accomplish this. The top of the pipe is then connected to the permanent pump, no inside tubing being used.

Several hundred wells, most of them about 50 feet deep, have been driven by Mr. Savage by the common sand-pumping process, 5-inch pipe in 10-foot lengths being used for casing, the sand being pumped out as the casing is forced down to good water-bearing material. A strainer, usually made of 3-inch pipe covered with punched brass or with wire gauze, is put down inside of the casing, with a 2-inch pipe extending to the surface of the ground. The annular space between the interior of the casing and the exterior of the strainer and suction pipe, extending to the surface of the ground, is filled with coarse sand, and the casing is withdrawn.

Usually the supply is from a gang of 30 or 40 wells. Centrifugal pumps are used exclusively, generally horizontal compound, discharging with good efficiency into the main pipe line against a head of 50 to 60 pounds pressure per square inch.

Ten of these pumping plants have been installed by Mr. Savage for the San Diego Land and Town Company, and he makes the following statements in regard to them and to the wells which they serve:

The wells are in a valley of recent sedimentary deposits, consisting of uneven and irregular (a few inches to a few feet thick) strata of water-bearing, sandy silt, separated by similar strata of impervious, clayey silt. The best results—

economy of installation, yield of water, and duration of supply—have been obtained from wells about 50 feet apart, connected to main suction lines having a pronounced grade away from the pump. The wells were put down by first sand pumping through 5-inch standard screw pipe, cut into lengths of about 10 feet, a sand pump or bucket with jar and rods being used. The bucket is made of 4-inch (outside diameter) casing pipe about 6 feet long. The first section of 5-inch pipe being started, a lever is clamped to it. This serves also as a platform upon which the men stand while working the sand pump, and when the pipe is being turned with the lever their weight assists in forcing it into the ground. Additional lengths of pipe are put on as required, and the operation is continued until water-bearing sand of sufficient coarseness and thickness of strata is found, when the strainer, with sufficient pipe to reach from the bottom of the well to the top of the ground, is inserted within the 5-inch pipe. The annular space between the 5-inch pipe and the outside of the strainer with its pipe extension is filled with coarse sand or gravel, after which the outer or 5-inch pipe is withdrawn.

The strainer is made of a piece of 3-inch pipe from 2 feet to 4 feet long (depending upon the fineness of the sand-bearing stratum), perforated with $\frac{1}{4}$ -inch holes spaced from 1 inch to $1\frac{1}{2}$ inches between centers. No. 12 B. W. G. wire is wound spirally over the perforated section (the spirals being spaced about 1 inch apart), which then is covered with a sheet of thin brass punched full of holes about $\frac{3}{8}$ inch in diameter. The punch was specially designed for this work. It has 24 points (four rows of six in a row), and one blow of the hammer is sufficient, the sheet being placed on a wood block. The punch makes either a cone or pyramidal truncated indenture through the sheet, which, when wrapped and soldered around the perforated pipe, gives a first-class strainer. The diameter of the holes punched in the brass sheet is reduced, of course, with the fineness of the water-bearing material. The holes presented to the water-bearing sand are very small, and since they increase in diameter toward the pipe, any material fine enough to enter does so without obstructing the opening. We use a 2-inch pipe extending from the strainer to the top of the ground.

As each well is completed a No. 6 Douglas hand pump is connected to the top, and it is thoroughly pumped, to free it from clayey matter and fine sand. Formerly we tested each well with a gasoline-actuated centrifugal pump, and left the bottom of the strainer pipe open. We have found it desirable, however, to plug the bottom of the strainer before putting it into the well, which of course decreases its capacity somewhat, but is imperative in quicksand formations. These wells yield 8 or 10 miners' inches each.

We are obtaining remarkably satisfactory results from horizontal centrifugal pumps, either single or compound, actuated by gasoline engines. I have just completed a plant, the supply of which is from a small gang of wells, which is operated by a No. 3 horizontal compound centrifugal pump actuated by a 22-horsepower gasoline engine, the water being discharged into the Sweetwater distributing system against 60 pounds pressure. When last measured the plant was developing a fraction more than 29 miners' inches.

There are numerous "tricks" connected with the installation and operation of these plants, both in sinking the wells and in operating the machinery, any one of which, we have found to our annoyance, would either make or break the success of the undertaking.

IRRIGATION IN UTAH VALLEY, UTAH.¹

INTRODUCTION.

During the latter half of the month of August, 1899, data were obtained for a brief report on the irrigation systems of Utah Valley.

¹Report of J. S. Baker.

Information regarding the history, the area irrigated, etc., was given by the presidents and directors of canal companies, by water masters, and by those most closely connected with irrigation along the various streams. In many cases the statements were from memory, although in most cases they were from records. Frequently it was necessary, owing to lack of time in which to make observations, to accept approximate estimates from those who contributed the information. In view of these facts the data are necessarily incomplete and in some cases are inaccurate, but they give, in a general way, the facts as they existed.

Utah Valley is in the north-central portion of the State, between the high Wasatch Range on the east and the low Lake Mountains on the west. There are about 150,000 acres of irrigable land in Utah County, most of it in Utah Valley. In 1890 there were 40,195 acres cultivated, and 36,586 acres irrigated; in 1899 there were about 65,000 acres irrigated. Utah Lake occupies, when at a mean elevation or "compromise line," about 84,000 acres in the northwestern part of the valley. The agricultural land lies along the eastern and southern sides. The upper lands consist of gravel, sand, and loam, while the lower lands bordering the lake are sandy loams and in many places adjacent to the lake are marshy.

Water for irrigation is supplied by Provo River, Spanish Fork, American Fork, Hobble Creek, Peteetnetr Creek, Current Creek, Summit Creek, Rock Canyon Creek, Goshen Warm Springs Creek, Salem Pond, Smith Brothers' spring, Mapleton Union or North reservoir, South Mapleton reservoir, and Mount Nebo reservoir. The principal facts in regard to these sources of supply are given in the following table and on succeeding pages:

Streams irrigating lands in Utah Valley in 1899.

Name of stream.	Drainage area.	Length.	Measurement.		Number of canals diverting water.	Area irrigated.
			Date.	Discharge.		
	<i>Sq. mi.</i>	<i>Miles.</i>	1899.	<i>Sec.-ft.</i>		<i>Acres.</i>
Provo River	1,000	90	June 29	1,745	16	a 20,000
Do			July 13	535		
Do			Aug. 16	340		
Spanish Fork	670	45	Aug. 22	139	5	17,708
American Fork	66	18	May 9	131	3	a 15,000
Do			Aug. 25	57		
Hobble Creek	160	25	Aug. 21	47	7	5,250
Peteetnetr Creek	30	10	May 1	21.3	17	1,400
Do			May 15	121.8		
Do			June 1	65.2		
Do			June 15	29.7		
Do			July 1	23.3		
Do			July 15	21.3		
Do			Aug. 1	17.0		
Do			Aug. 15	15.6		
Current Creek	12	12			7	2,500
Summit Creek		8	Aug. 23	14.6	b 8 to 14	1,200
Rock Canyon Creek			do	a 1.0		400
Goshen Warm Springs Creek			do	5.5	3	825
Spring Lake Creek			do	2.9		150
Salem Pond			Aug. 22	5.0	1	600
Smith Brothers' spring			Aug. —	.9		c 40

a Approximate.

b Some canals discontinue in low-water season.

c Orchard and vineyard.

The methods of irrigation throughout the entire valley are flooding for small grains and grasses and the furrow method for orchards and vegetables. The water is distributed on a time basis.

PROVO RIVER.

Provo River is the largest stream entering Utah Valley. It has its source in the summit of the Uinta Mountains, on the boundary line between Summit and Wasatch counties, and very near the sources of Bear, Weber, and Duchesne rivers. For about 18 miles it flows through a precipitous canyon, which in cases of heavy rainfall yields a large run-off. The river is therefore subject to great fluctuation. At the upper end of Provo Canyon is a large valley of the same name. This valley is useful to the lower irrigators as an underground storage reservoir. A part of the water of the river is applied to the land of the valley during the early part of the season, and reaches the river again by seepage shortly after the commencement of the low-water period, thus increasing the flow during that season. Indeed, it has been suggested by the people of Provo that the irrigators of the upper valley be paid to irrigate the uncultivated lands of that valley so as to still further increase, by seepage, the flow of the river below at a time when water is most needed. Since 1883 there have been but four years in which Provo River has carried a sufficient quantity of water to supply the needs of the irrigators below.

The water of the river is allotted as follows: Blue Cliff canal, Timpanogas canal, Provo Bench canal, one-eighth; Roberts's ditch, Park & Nuttall's ditch, Bomb & Richardson's ditch, Richmond & Penrod's ditch, Stubbs & Furgeson's ditch, West Union canal, two-fifteenths; Upper East Union canal, one-twelfth; Lake Bottom canal, one-fifteenth; East Union canal, Factory race, City race, and Tanner's, forty-three hundredths; and Little Dry Creek canal, one-fifteenth.

Blue Cliff canal.—This is the first canal diverting water from Provo River. It heads about $2\frac{1}{2}$ miles above the mouth of Provo Canyon, on the north side of the stream. The greater part of it was built by the labor of the owners, but small portions were built under contract. In connection with this canal there is contemplated a reservoir on Provo Bench, three-fourths of a mile northwest from the mouth of Provo Canyon, with an area of 20 acres, a depth of 10 feet, and a capacity of 200 acre-feet.

Timpanogas canal.—This is the second canal diverting water from the river. It was built entirely by the labor of the appropriators. Measurements made July 9, 1897, by the water commissioner, Mr. A. L. Booth, of Provo, show a discharge of 7.27 second-feet. An annual tax of 50 cents per share, to pay the water master and general expenses of operating, is levied on the stock of the company. Considerable trouble has been experienced by frequent breaks in the embankment, which have deprived the irrigators of the use of water for a considerable length of time. Measurements for seepage loss were made August 16, 1899, one near the head and one 9,500 feet below. At the upper point the discharge was 10.40 second-feet; at the lower point it was 7.83 second-feet, showing a loss of 2.57 second-feet,

or 24.6 per cent of the discharge at the head. This is equal to a loss of 2.6 per cent per 1,000 feet.

Provo Bench canal.—This is the third canal diverting water from the river. It heads near the mouth of the canyon, on the west side of the stream. The diverting dam is made of two large logs buried to their tops, horizontally, in the bed of the stream, at right angles to the current. The lower log, which is 10 feet farther downstream, is the higher. On top of the logs planks are spiked transversely. An apron of 2-inch plank extends from the crest of the dam 20 feet downstream. On top of the crest and extending along it is a plank 10 inches high, placed on edge. The gates are two in number, each 7 feet high, 6 feet wide, and of 2-inch plank. They are operated by a rack and pinion and hand lever. The original water rights were acquired by appropriation, but later the canal was enlarged and water to fill it was purchased. Measurements for seepage on this canal were made August 17, 1899. The loss from that source and from evaporation was 4.31 second-feet (equal to 7.4 per cent of the amount at the head) in a distance of 1.5 miles. There are five small ditches diverting water from the river and from what is known as City Creek. Two of them—Roberts's ditch and Park & Nuttall's ditch—are on the west side of the river, and three of them—Bomb & Richardson's, Richmond & Penrod's, and Stubbs & Furgeson's—are on the east side of the river. Measurements of these ditches were made August 17 and 18, 1899, the results of which are given in the table on page 503.

West Union canal.—This canal is the fourth one diverting water from Provo River. It heads 1 mile below the mouth of Provo Canyon, on the west side of the stream. It was constructed in 1875-76 by day labor. In 1897 the West Union Canal Company consolidated with the Enterprise Canal Company under the name of the East Union Canal Company, and the canal was enlarged so as to carry the supply of both companies. The water has a rental value of \$2 per share per annum. Measurements made on July 9, 1897, showed a discharge of 29.3 second-feet, and those made on August 4, 1897, a discharge of 30.6 second-feet. The interest in the canal is separate from that in the land; water rights do not go with the land, but are bought and sold as other property. Each owner can sell or rent his proportion of the water if he does not care to use it, but if he does not sell or rent it the company can do so and the revenue goes into the treasury of the company.

Upper East Union canal.—This is the fifth canal diverting water from the river, and the uppermost from City Creek, an old river channel through which irrigation water for the city of Provo is taken to the four canals serving it. The construction of the Upper East Union canal was begun in 1871 and was completed in 1874. It was built by day labor of the appropriators and by contract. The water rights were acquired by original appropriation. One share of stock in the company covers the right to the use of enough water to irrigate 1 acre of land. The canal was designed to carry 30 second-feet of water. On July 9, 1897, there were 32.35 second-feet flowing in it, and on August 4, 1897, 21.45 second-feet. Measurements made in 1899 will be found in the table on page 503. The loss in seepage on August 17, 1899, in a distance of 1 mile, was 0.75 second-foot, or 2.65 per cent of the amount at the head of the canal.

Lake Bottom canal.—This is the sixth canal diverting water from the river, and the lowest from the west side. It is taken out about 4 miles below the mouth of Provo Canyon. It was constructed in 1861, by the labor of the appropriators. Measurements were made July 9, 1897, near the head of the canal, and showed a discharge of 15.78 second-feet; those made August 4, 1897, showed a discharge of 12 second-feet. A large amount of water seeps into this canal from the irrigated land above, which consists of a deep gravel deposit. Being supplemented by seepage water it is not so subject to shortage as are the canals above.

East Union canal.—This is the seventh canal diverting water from Provo River. It is supplied through City Creek. It is nearly parallel to the Upper East Union canal, at an average distance of five-eighths of a mile. It was constructed in 1857, by the labor of the appropriators. The capacity was designed to be 27 second-feet. In 1874, upon the petition of the owners, the canal was placed under the control of the city of Provo, for the reason that most of the land under it was within the city. The water rights are valued at from \$60 to \$70 per acre for farms and \$125 per acre for city lots.

Factory race.—This race is the eighth canal diverting water from the river. It is supplied through City Creek. It was enlarged in 1872, when an additional amount of water was appropriated. Its capacity is about 67 second-feet. Like the East Union canal, it was placed under municipal control in 1874. About three-fifths of the water of this canal is used by the Provo mills for power purposes; the remainder is used for irrigation.

Tanner's race.—This is the tenth canal diverting water from the river. Some of the water is used for power purposes, but after having passed the mills it is again used for irrigation. The capacity of the canal is about 27 second-feet. It was taken under the control of the city of Provo in 1874.

Little Dry Creek canal.—This is the last and the oldest canal diverting water from Provo River. Its headworks are near the northwestern part of the city of Provo. It was constructed in 1852, by the labor of the appropriators. On July 9, 1897, a measurement was made which showed a discharge of 12.5 second-feet; on August 4, 1897, another measurement was made which showed a discharge of 8.8 second-feet. Measurement made in 1899 will be found in the table on page 503.

Data regarding Provo River canals.

Name of canal.	Year of appropriation.	Capital stock.	Number of shares.	Value of shares.	Dimensions of canal.		
					Length.	Width.	Depth.
Blue Cliff canal <i>a</i>	1884	\$50,000	2,000	\$25	<i>Miles.</i> 7	<i>Feet.</i> 6	<i>Feet.</i> 2
Timpanogas canal.....	1878	4,125	165	25	6	.....	.....
Provo Bench canal.....	1866	.....	.....	.....	9.5	.....	.....
Roberts's ditch <i>b</i>.....	.....	.....	.....	.....	.....	.....	.....
Park & Nuttall's ditch <i>b</i>.....	.....	.....	.....	.....	.....	.....	.....
Bomb & Richardson's ditch <i>b</i>.....	.....	.....	.....	.....	.....	.....	.....
Richmond & Penrod's ditch <i>b</i>.....	.....	.....	.....	.....	.....	.....	.....
Stubbs & Furgeson's ditch <i>b</i>.....	.....	.....	.....	.....	.....	.....	.....
West Union canal.....	1876	24,000	1,200	20	10	.....	.....
Upper East Union canal.....	1872	17,220	1,722	10	7.5	.....	.....
Lake Bottom canal.....	1858	.....	.....	.....	7	.....	.....
East Union canal <i>c</i>	1857	.....	.....	.....	5.5	.....	.....
Factory race.....	(<i>d</i>)	.....	.....	.....	4.5	12	3.5
City race <i>c</i>.....	.....	.....	.....	.....	5	.....	.....
Tanner's race <i>c</i>	1856	.....	.....	.....	6	.....	.....
Little Dry Creek canal.....	1852	4,000	400	10	4	.....	.....

a In course of construction.

b Data not ascertained.

c Under control of city of Provo.

d Time of first appropriation not learned; second appropriation in 1872.

Duty of water of Provo River canals in 1899.

Name of canal.	Measurements.		Length of irrigation period.	Duty of water.			
	Date.	Discharge.		Area irrigated.	Amount used.		Depth.
Bluff Cliff canal <i>a</i>	1899.	<i>Sec.-feet.</i> 41.66	Apr. 1 to Sept. 1	<i>Acres.</i> b 2,700	<i>Sec.-ft.</i> b 41.66	<i>Acre-ft.</i> b 12,643	<i>Feet.</i> b 4.68
Timpanogas canal.....	Aug. 16	c 10.40 d 7.84	Apr. 15 to Sept. 15	650	7.84	2,379	3.66
Provo Bench canal.....	Aug. 17	e 53.65 e 57.96	Apr. 1 to Sept. 1	4,000	53.65	16,281	4.07
Roberts's ditch.....	do	2.80	Apr. 15 to Sept. 15	-----	-----	-----	-----
Park & Nuttall's ditch.....	do	11.84	do	-----	-----	-----	-----
Bomb & Richardson's ditch.....	Aug. 18	f 1.00	do	-----	-----	-----	-----
Richmond & Penrod's ditch.....	do	f 4.00	do	g 1,200	10.00	3,035	2.52
Stubbs & Furgeson's ditch.....	do	f 5.00	do	-----	-----	-----	-----
West Union canal.....	Aug. 17	55.98	do	3,500	55.98	16,988	4.85
Upper East Union canal.....	do	c 23.27 d 27.52	do	-----	-----	-----	-----
Do.....	May 8	29.28	Apr. 15 to Sept. 15	680	-----	-----	-----
Lake Bottom canal.....	Aug. 17	7.14	do	-----	-----	-----	-----
East Union canal.....	Aug. 18	18.22	do	-----	-----	-----	-----
Factory race.....	do	51.44	do	h 300	-----	-----	-----
City race.....	do	12.40	do	380	-----	-----	-----
Tanner's race <i>i</i>	Aug. 17	16.94	do	490	-----	-----	-----
Little Dry Creek canal.....	do	4.64	do	400	4.64	1,408	3.52

a Not yet completed.*b* Calculated.*c* Near head.*d* Near laterals.*e* One-half mile above first measurement.*f* Float measurement.*g* These three canals irrigate low land.*h* Acreage reported by Walter Scott, of Provo; three-fifths of the stream used for power.*i* Irrigates city property almost exclusively.

SPANISH FORK.

Spanish Fork is the second river of importance in Utah Valley. It rises near Soldiers Summit, in the tops of the Wasatch Mountains, near the eastern rim of the Great Basin. Throughout the greater part of its course it passes through a deep and narrow canyon about 30 miles in length, enters Utah Valley in the southeast corner, and thence flows in a northwesterly direction into Utah Lake. The following canals divert water from it for irrigation purposes:

East Bench canal.—This canal heads a short distance above the mouth of Spanish Fork Canyon, on the north side of the river. It irrigates the high bench east of the city of Spanish Fork.

Salem Irrigation Company's canal.—This canal heads a short distance below the East Bench canal, but on the south side of the river. It was planned in 1868, and was constructed in 1869–70, by the labor of the appropriators. Measurements are made every year at the head gate, which is 4 feet wide, and the depth varies from 17 inches down. This is all that is known by the irrigators of the amount of water flowing in the canal. As a means of keeping the canal free from sediment and aquatic vegetation, it is dredged twice each week during the irrigation season. The dredge is made of a railroad rail bent in a V shape, the distance between the two ends of the rail being equal to the width of the canal. The dredge is fastened by the apex, with the flange down, to the rear end of a cart, and is drawn down the entire length of the canal. This keeps the canal free from vegetation, prevents the accumulation of silt, and eliminates the necessity of an annual clean-up.

South Field Irrigation Company's canal.—This canal is taken out of the river

on the south side, below the Salem canal. It irrigates what is known as the Spanish Fork south field. It was constructed in 1867, partly by labor of the appropriators and partly by contract. Measurements are made every week, by the water master, over a weir board. Measurement made in 1899 is given in the last table on this page.

City canal.—This canal heads on the north side of the river, and conducts the water northwesterly about 3 miles, to the city of Spanish Fork. The water is used for power and for irrigation purposes. After leaving the mills the water used for power purposes is again used for irrigation. The water is owned by three companies—Spanish Fork Municipal Corporation, Southeast Field Irrigation Company, and Spanish Fork West Field Irrigation Company. The canal was built in 1850, by day labor of the appropriators; in 1865 it was enlarged to its present size. To the division gates, where the water is divided into the three canals by weir gates, as they are called, it is controlled by the city of Spanish Fork.

Lake Shore canal.—This canal is the last one diverting water from Spanish Fork. It heads on the south side of the river, about 3 miles west of the city of Spanish Fork. The channel of the river at that point is cut deep into the sandy soil, and consequently the canal is very deep.

Data regarding Spanish Fork canals.

Name of canal.	Year of appropriation.	Capital stock.	Number of shares.	Value of shares.	Dimensions.		
					Length.	Width.	Depth.
					<i>Miles.</i>	<i>Feet.</i>	<i>Feet.</i>
East Bench canal.....							
Salem Irrigation Company's canal.....		\$44,160	2,208	\$20.00	6		
South Field Irrigation Company's canal.....	1867	39,600	3,300	12.00	7		
City canal.....					a 3		
Spanish Fork Municipal Corporation canal.....	1850						
Southeast Field Irrigation Company's canal.....	1865						
Spanish Fork West Field Irrigation Company's canal.....	1865						
Lake Shore canal.....							

a Length of main canal, exclusive of laterals.

Duty of water of Spanish Fork canals in 1899.

Name of canal.	Measurements.		Length of irrigation period.	Duty of water.			
	Date.	Dis-charge.		Area irrigated.	Amount used.		Depth.
		<i>Sec.-ft.</i>		<i>Acres.</i>	<i>Sec.-ft.</i>	<i>Acre-ft.</i>	<i>Feet.</i>
East Bench canal.....	1899. May 11	80.47					
Do.....	Aug. 22	28.19	May 1 to Sept. 15	5,000	54.30	15,940	3.19
Salem Irrigation Company's canal.....	do	22.05	do	2,208	22.05	6,473	2.93
South Field Irrigation Company's canal.....	do	37.39	do	4,000	37.39	10,976	2.74
City canal.....	do	38.51	do	6,500	38.51	11,307	1.74

AMERICAN FORK.

Beginning at the north end, the first river entering Utah Valley is the American Fork. This stream is probably the third in importance. It rises in the northeastern part of Utah County, on the western slope

of the Wasatch Mountains, and flows in a southwesterly direction into Utah Lake. The water is used for power and for irrigation purposes. It is very cold and is perfectly transparent as it emerges from the deep canyon into the valley. The power plant is above the headworks of the canals, and all of the water reenters the river before any is diverted for irrigation purposes. All of the water in the river is diverted at the mouth of the canyon into three canals, namely, the Lehi canal, the American Fork canal, and the Pleasant Grove canal. A crib weir is placed across and at right angles to the river bed, being held in place by rock filling. The upper side of the weir is made impervious by planking and earth filling. Near the top of the weir are four rectangular openings, which allow the water to flow into the respective canals, two of the openings being for the American Fork canal. The admission of water is regulated by means of flashboards. The waters of the American Fork are divided as follows: Lehi canal, one-third from July 1 to September 20, one-sixth from September 20 to July 1; American Fork canal, eight twenty-firsts during the irrigation period; Pleasant Grove canal, two-sevenths from April 15 to September 20, and from September 20 to April 15 only sufficient for culinary purposes.

Lehi canal.—This canal is on the north side of the canyon, and has a westerly course to Lehi, a distance of 5 miles. A shortage of water occurs each year, due to an insufficient amount in the river.

American Fork canal.—This canal receives its water through the middle portion of the river weir. The direction of the canal is southwest, following the old river bed the greater part of the distance to the city of American Fork. The water is under the control of that city. The rights were acquired by appropriation. They belong to the land for which the water was appropriated and can not be transferred. There has always been a shortage of water, not more than half the necessary quantity being available, but there has been no litigation on that account, probably because the distribution is under municipal control.

Pleasant Grove canal.—This canal receives its water from the south opening in the American Fork weir. The direction of the canal is southeasterly to Pleasant Grove. It irrigates the city lots of Pleasant Grove and the fields in that vicinity.

Duty of water of American Fork canals in 1899.

Name of canal.	Measurements.		Length of irrigation period.	Duty of water.			
	Date.	Discharge.		Area irrigated.	Amount used.		Depth.
	1899.	<i>Sec.-ft.</i>		<i>Acres.</i>	<i>Sec.-ft.</i>	<i>Acre-ft.</i>	<i>Feet.</i>
Lehi canal	Aug. 25	17.82	Apr. 1 to Sept. 20	-----	-----	-----	-----
American Fork canal	May 9	73.91	do	7,000	-----	-----	-----
Do.	Aug. 25	28.85	-----	-----	51.38	17,631	2.52
Pleasant Grove canal	May 9	39.40	-----	-----	-----	-----	-----
Do.	Aug. 25	10.71	Apr. 1 to Sept. 20	5,000	25.05	8,596	1.72

HOBBLE CREEK.

Hobble Creek enters Utah Valley at about the center of its eastern side, and irrigates the land in Springville and the immediate vicinity.

All of the canals diverting water from the creek are under the control of the city of Springville. A water privilege consists of the right to use a certain amount of water, apportioned by the water master, for three hours per acre each three weeks. These rights were acquired by appropriation, and can not be transferred from one party to another except by a transfer of the land. The chief water master is appointed by the city council for the term of one year. He in turn appoints sub water masters, who divide the water among the irrigators of their respective districts.

There is an annual tax of 6 cents per acre watered, to meet the expenses of the system. Usually there are six applications of the water to the land each year, some crops requiring more and some less than that number.

Nearly every year prior to 1899 there has been a shortage in the canals diverting water from Hobble Creek, but there has never been any litigation in consequence of the shortage. When the water becomes low in the latter part of the season the irrigators having the titles of most recent dates are deprived of the use of the water, all of which is reserved for those having prior rights.

Mapleton Reservoir canal.—This is the uppermost canal diverting water from Hobble Creek. It heads a short distance above the mouth of the canyon. It was constructed in 1878, by the appropriators. In the spring of 1899 it was bought by the city of Springville for \$750, under an agreement which gave the former owners an equal right with the remainder of the Springville irrigators.

Mapleton Union canal.—This is the second canal diverting water from Hobble Creek. It takes its water from the south side of the stream. It was built in 1853 and went under the control of the city in 1877.

North Bench canal.—This is the third canal diverting water from the creek, and the uppermost on the north side. It was built in 1852. The seepage into it from the hillside was found to be 0.04 second-foot in a distance of three-fourths of a mile.

Island canal.—This is the fourth canal diverting water from the creek. It is taken out on the north side, and was constructed in 1851.

Sage Creek canal.—This is the fifth canal diverting water from the creek. It is on the south side of the stream. It was constructed in 1860, by the labor of the appropriators.

South Big Field ditch.—This canal diverts water from the north side of the creek. It was constructed in 1861.

City ditch.—This is the lowest ditch diverting water from Hobble Creek. It was constructed in 1850, by the labor of the owners.

Data regarding Hobble Creek canals.

Name of canal.	Year of appropriation.	Length of canal.
		Miles.
Mapleton Reservoir canal.....	1878	0.75
Mapleton Union canal.....	1868	3.0
North Bench canal.....	1852	3.0
Island canal.....	1851	1.0
Sage Creek canal.....	1860	1.5
South Big Field ditch.....	1851	2.0
City ditch.....	1850	1.0

Duty of water of Hobbie Creek canals in 1899.

Name of canal.	Measurements.		Length of irrigation period.	Duty of water.			
	Date.	Dis-charge.		Area irrigated.	Amount used.		Depth.
	1899.	<i>Sec.-feet.</i>		<i>Acres.</i>	<i>Sec.-ft.</i>	<i>Acre-ft.</i>	<i>Feet.</i>
Mapleton Reservoir canal.....	May 10	7.87	May 1 to Sept. 15	100	-----	-----	-----
Do.....	Aug. 21	3.09			-----	-----	-----
Mapleton Union canal.....	May 10	26.14			-----	-----	-----
Do.....	Aug. 21	17.95	May 1 to Sept. 15	2,400	22.12	6,055	2.52
		19.11					
North Bench canal.....	May 10	11.65					
Do.....	Aug. 21	8.39	May 1 to Sept. 15	800	10.00	2,737	2.72
Island canal.....	do	4.02	do	250	4.02	1,101	4.40
Sage Creek canal.....	do	5.96	do	500	5.96	1,631	3.26
South Big Field ditch.....	do	5.52	do	800	5.52	1,511	1.89
City ditch.....	do	2.21	do	400	2.21	605	1.51

PETEETNETR CREEK.

Perhaps the best and most complete irrigation system in Utah Valley is that of Peteetnetr Creek. This stream has its source near the top of the high mountains north of Mount Nebo, about 10 miles southeast of Payson. At the head of the creek and its branches are five reservoirs. The largest covers 30 acres and has a mean depth of 10 feet; the next largest covers 25 acres and has a mean depth of 10 feet; the others cover from 7 to 10 acres each, with mean depths of from 5 to 7 feet. The dams are all of earth. The construction of the largest reservoir is under the charge of Mr. R. C. Gemmel, State engineer of Utah. The reservoirs were begun in 1887, but no benefits were derived from them until 1891. They are fed principally by the flood waters that occur during the spring, the springs flowing to them being small. The reservoirs and the creek are under the control of the city of Payson. There is an annual tax, for the maintenance of the system and the payment of the water master, of 25 cents per acre for farms and 65 cents per acre for city lots. The water of the creek and the reservoirs is divided into seventeen streams, through seventeen Cippoletti weirs, and the water of the streams is distributed on a time basis. The area irrigated is 1,400 acres. The flow of the creek is measured above all diversions over a rectangular weir with 12 feet length of crest.

Measurements over weir on Peteetnetr Creek in 1899.

Date.	Depth of water.	Dis-charge.	Dis-charge for month.	Depth for month.
1899.	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Acre-ft.</i>	<i>Feet.</i>
May 1.....	0.6667	21.3	4,396	3.14
May 15.....	2.1667	121.8		
June 1.....	1.4167	65.2		
June 15.....	.8333	29.7	2,826	2.02
July 1.....	.7083	23.3		
July 15.....	.6667	21.3	1,371	.98
August 1.....	.5729	17.0		
August 15.....	.5417	15.6	1,002	.71

NOTE.—The number of acre-feet and the depth are greater than those actually used, the measurements being made a great distance from the land to which the water was applied, and there being considerable loss by seepage and evaporation.

The water of the creek was appropriated in 1851. The water master, appointed by the city council, attends to the general division of the water at the weirs. When necessary he appoints sub water masters to attend to the subdivision. At the beginning of each irrigation season the water master issues to each irrigator a schedule stating the time at which he is to take the water for each turn during the entire season. There has not been a shortage of water on this stream since 1888, and there has been no litigation on account of shortage.

The principal crops raised are wheat, oats, potatoes, fruit, and sugar beets. Of the last, 160 acres were raised in 1898, the average yield being 18 tons per acre. This would make a total of 2,880 tons, the value of which, at \$3.75 per ton, would be \$10,800, or \$67.50 per acre.

CURRENT CREEK.

This creek heads near the western base of Mount Nebo. Its general course is north. It is about 12 miles long, and empties into Utah Lake at the extreme southern end.

Its waters are impounded by a dam placed across the channel about 1 mile west of Goshen. This reservoir is used as a distribution basin, from which seven canals receive their supply of water. The creek irrigates about 2,500 acres. The irrigation period extends from April 1 to October 1.

On the west side of Mount Nebo, in the south end of Utah County, in what is known as Mona Valley, is the Mount Nebo Land and Irrigation Company's reservoir, which when full covers about 2,000 acres to a mean depth of 12 feet, and is supplied by the winter flow of Current Creek. The dam is built of selected and graded earth. The top length is 215 feet, the bottom length 125 feet. The bottom width is 101 feet, the top width 10 feet, the height 25 feet. About 25 feet down the lower slope there is a 3-foot berm. The entire dam is covered with riprap. The outlet tunnel is cut through the solid rock, about 37 feet below the surface. The valves are of the kind known as the butterfly valve—fastened to vertical shafts and operated from the valve house by a worm gear. The spillway is cut through the solid rock around the northern end of the dam. It is 25 feet wide, 5 feet deep, 200 feet long, and its crest is 5 feet below the top of the dam. The water is drawn off and emptied into the old creek bed below the dam, and is carried down the canyon about 2 miles to the division gates, where the reservoir water is diverted into the canal of the Mount Nebo Irrigation Company, and the natural flow of the stream is allowed to pass down the old channel. The water of the Mount Nebo Irrigation Company is conducted by a semicircular stave flume the greater part of the distance down the canyon. One crossing of the canyon is made on a trestle and another by means of an inverted siphon. At each end of the siphon the flume is gradually

contracted into the pipe. In 1899 the water from this reservoir irrigated about 2,100 acres, but there was only about five-sixths of the quantity necessary to mature the crops. There are about 10,000 acres of land tributary to the canal.

SUMMIT CREEK.

Summit Creek rises in the tops of the mountains on the south-central side of Utah Valley. Its course is northwest, and its length about 8 miles. The first and only measurement of the stream made by the writer was on August 23, 1899. The discharge at that time was 14.64 second-feet. The stream is owned and controlled by the Santaquin Irrigation and Canal Company, which was incorporated in 1875. The irrigation season is from April 1 to October 25.

GOSHEN WARMSPRINGS CREEK.

This creek rises in the level of Goshen Valley—adjacent to Utah Valley at the extreme southern end—near the base of the Nebo Range, and irrigates land on the east side of Goshen Valley. On August 23, 1899, the aggregate discharge of the streams, three in number, was estimated to be 5.5 second-feet, which was an average of the flow for the season. The number of acres irrigated is 825. The irrigation season extends from April 1 to October 1, or 183 days. The total discharge during that time would be 2,006 acre-feet, which would cover the 825 acres to a depth of 2.42 feet. The crops raised are meadow hay, alfalfa, and grain.

ROCK CANYON CREEK.

This stream flows from a deep canyon northeast of the city of Provo, and irrigates land lying between the foot of the mountains and the Timpanogas canal. The irrigation season extends from April 1 to September 1. The mean discharge during the irrigation season is nearly 4 second-feet, or a total of 1,214 acre-feet. The area irrigated is 400 acres, which would be covered to a depth of 3.04 feet. The soil consists of a gravel and sand wash. The crops raised are grain and alfalfa.

SPRING LAKE CREEK.

This creek has its source in a small lake or pond which covers 20 acres to a mean depth of 4 feet. It is used as a storage reservoir and also as a means of raising the water sufficiently to irrigate the higher land. A measurement of the stream was made on August 23, 1899, the discharge being 2.89 second-feet. The number of acres irrigated is 150.

RATING TABLES.

The following pages contain the rating tables for the various river stations described in Water-Supply Papers Nos. 47 to 51, inclusive. In each case the table shows the relation which has been found to exist during the year 1900 between the height of water on the gage and the discharge in cubic feet per second. The tables have been prepared from measurements made during 1900 or previous years, and are used in computing the daily flow, the results of which will be published in the Twenty-second Annual Report, Part IV.

Referring to the tables, the numbers in parentheses in the box heads are the pages in the Water-Supply Papers of the series for 1900 (Nos. 47 to 51, inclusive) on which the various gaging stations are described. At the end of the descriptions are given the results of discharge measurements made during 1900 and the daily gage heights. From these and earlier data the relation of gage height to discharge has been deduced. Take, for example, the first table—Delaware River at Lambertville, New Jersey. On page 80 of Water-Supply Paper No. 47 is given the daily gage height, in feet, at that station during the year 1900. On March 1 the gage height was 5.40 feet. The flow equivalent to that gage height is shown in the following table to be 20,300 second-feet. With the gage heights and the rating tables at hand, the daily and monthly flow of any stream can easily be determined. The latter (the monthly discharge) has been worked up for most of the stations maintained by the Survey, and will, as already stated, be published in the Twenty-second Annual Report, Part IV.

Rating tables for stations in New Jersey, Pennsylvania, Maryland, and West Virginia.

[Numbers in box heads refer to pages in Water-Supply Papers Nos. 47 and 48.]

Discharge, in second-feet.												
Gage height, in feet.	Delaware River at Lam- bertville, N. J. (80).	North Branch of Sus- quehanna River at Wilkesbarre, Pa. (110).	North Branch of Sus- quehanna River at Danville, Pa. (111).	West Branch of Susque- hanna River at Allen- wood, Pa. (111).	Junata River at New- port, Pa. (112).	Susquehanna River at Harrisburg, Pa. (113).	Potomac River at Woodstock, Md. (115).	North Branch of Poto- mac River at Pied- mont, W. Va. (115).	Antietam Creek near Sharpsburg, Md. (117).	North Branch of Shen- andoah River near Riverston, Va. (118).	Shenandoah River at Millville, W. Va. (120).	Potomac River at Point of Rocks, Md. (121).
0.0						3,500						
0.2						3,230						1,000
0.4						4,020					540	1,400
0.6						4,820					740	1,860
0.8						5,720					940	2,360
1.0						6,880					1,140	2,900
1.2				300		8,150					1,370	3,600
1.4				500		9,450					1,650	4,300
1.6			825	750		10,750					1,950	5,100
1.8			1,100	1,050		12,300					2,260	6,020
2.0			1,400	1,350		13,900					2,600	7,000
2.2		1,000	1,800	1,700		15,500		34	217		2,960	7,980
2.4	1,750	1,200	2,250	2,150		17,300		124	348		3,340	8,960
2.6	2,100	1,400	2,750	2,650	350	19,300		230	416		3,740	9,940
2.8	2,600	1,600	3,300	3,250	600	21,300		289	485	140	4,160	10,920
3.0	3,300	1,860	3,900	4,000	1,000	23,400	50	352	560	380	4,600	11,900
3.2	4,100	2,120	4,550	5,200	1,400	25,625	83	430	655	580	5,060	13,040
3.4	5,050	2,400	5,250	7,500	1,820	27,925	122	525	775	805	5,540	14,240
3.6	6,100	2,700	6,000	10,750	2,270	30,300	173	640	887	1,035	6,050	15,460
3.8	7,250	3,000	6,800	14,000	2,750	32,800	235	775	1,001	1,265	6,600	16,680
4.0	8,550	3,300	7,650	17,250	3,250	35,400	310	920	1,215	1,495	7,190	17,900
4.2	10,000	3,600	8,575	20,500	3,750	38,100	400	1,080	1,329	1,725	7,790	19,120
4.4	11,650	3,940	9,525	23,750	4,300	41,100	520	1,240	1,443	1,955	8,410	20,340
4.6	13,350	4,340	10,500	27,000	4,900	44,590	670	1,400	1,557	2,185	9,040	21,560
4.8	15,050	4,760	11,500	30,250	5,500	48,170	830	1,560	1,671	2,415	9,680	22,780
5.0	16,750	5,200	12,550	33,500	6,200	51,750	1,000	1,720	1,785	2,645	10,320	24,000
5.2	18,500	5,700	13,720	36,750	6,900	55,330	1,200	1,880		2,875	10,960	25,220
5.4	20,300	6,250	14,900	40,000	7,700	58,910	1,400	2,040		3,105	11,600	26,440
5.6	22,150	6,850	16,100	43,250	8,500	62,490	1,600	2,200		3,335	12,240	27,660
5.8	24,050	7,560	17,390	46,500	9,350	66,070	1,800	2,360		3,565	12,880	28,880
6.0	25,950	8,340	18,800	49,750	10,250	69,650	2,000	2,520		3,795	13,520	30,100
6.2	27,850	9,240	20,240	53,000	11,150	73,230	2,205	2,680		4,025*	14,160	31,400
6.4	29,750	10,260	21,680	56,250	12,060	76,810	2,410	2,840		4,255	14,800	32,700
6.6	31,700	11,360	23,120	59,500	13,000	80,390	2,615	3,000		4,485	15,440	34,100
6.8	33,710	12,480	24,560	62,750	14,000	83,970	2,820	3,160		4,715	16,080	35,500
7.0	35,750	13,600	26,000	66,000	15,000	87,550	3,025	3,320		4,945	16,720	36,950
7.5	40,900	16,400	29,660	74,125	17,500	96,500	3,538	3,720		5,520		40,800
8.0	46,050	19,200	33,200	82,250	20,000	105,450	4,050	4,120				44,900
8.5	51,200	22,000	36,800	90,375	22,500	114,400	4,562	4,520				49,300
9.0	56,350	24,800	40,400	98,500	25,000	123,350		4,920				53,850
9.5	61,500	27,600	44,000	106,625	27,500	132,300						58,400
10.0		30,400	47,600	114,750	30,000	141,250						62,950
10.5		33,200	51,200	122,875	32,500	150,200						67,500
11.0		36,000	54,800	131,000	35,000	159,150						72,050
11.5		38,800	58,400	139,125		168,100						76,600
12.0		41,600	62,000	147,250		177,050						81,150
12.5		44,400		155,375		186,000						85,700
13.0		47,200		163,500		194,950						90,250
13.5		50,000				203,900						94,800
14.0		52,800				212,850						99,350
14.5		55,600				221,800						103,900
15.0		58,400				230,750						108,450
15.5		61,200				239,700						113,000
16.0		64,000				248,650						117,550
16.5		66,800				257,600						122,100
17.0		69,600				266,550						126,650

Rating tables for stations in Maryland, Virginia, North Carolina, and South Carolina.

[Numbers in box heads refer to pages in Water-Supply Paper No. 48.]

Discharge, in second-feet.												
Gage height, in feet.	Monocacy River near Frederick, Md. (125).	North (of James) River at Glasgow, Va. (127).	James River at Buchanan, Va. (128).	James River at Cartersville, Va. (128).	Roanoke River at Roanoke, Va. (130).	Roanoke River at Neal, N. C. (131).	Tar River at Tarboro, N. C. (134).	Neuse River at Selma, N. C. (135).	Cape Fear River at Fayetteville, N. C. (137).	Yadkin River at Salisbury, N. C. (139).	Catawba River at Rockhill, S. C. (144).	Broad River (of the Carolinas) near Alston, S. C. (146).
0.2	.....	.....	.....	.....	.....	1,440	a 290	b 150	.....	.....	.....	.....
0.4	.....	.....	.....	720	55	1,560	350	184	330	.....	.....	.....
0.6	.....	.....	.....	910	85	1,680	410	218	375	.....	.....	.....
0.8	.....	280	.....	1,150	120	1,800	480	252	429	.....	.....	.....
1.0	.....	350	.....	1,420	170	1,920	550	290	489	.....	.....	.....
1.2	.....	450	.....	1,730	240	2,050	620	330	550	1,040	.....	.....
1.4	.....	580	.....	2,060	325	2,180	690	370	612	1,300	1,550	.....
1.6	.....	720	310	2,420	420	2,310	760	413	678	1,560	1,750	.....
1.8	.....	890	360	2,800	540	2,440	840	459	744	1,870	2,030	1,210
2.0	.....	1,090	430	3,200	670	2,580	920	505	810	2,250	2,390	1,470
2.2	.....	1,300	540	3,600	820	2,720	1,000	555	876	2,750	2,830	1,735
2.4	.....	1,520	670	4,000	1,010	2,860	1,080	605	946	3,250	3,380	2,010
2.6	.....	1,750	840	4,410	1,240	3,000	1,160	658	1,022	3,790	4,060	2,300
2.8	.....	1,990	1,050	4,830	1,540	3,140	1,240	714	1,103	4,370	4,880	2,720
3.0	.....	2,240	1,330	5,260	1,920	3,280	1,320	770	1,187	4,950	5,750	3,160
3.2	.....	2,500	1,650	5,700	2,325	3,420	1,400	830	1,273	5,610	6,632	3,620
3.4	.....	2,760	1,980	6,140	2,735	3,560	1,480	890	1,367	6,285	7,516	4,080
3.6	45	3,020	2,330	6,580	3,145	3,700	1,565	951	1,467	6,990	8,400	4,540
3.8	90	3,300	2,690	7,040	3,555	3,840	1,655	1,013	1,567	7,720	9,284	5,000
4.0	150	3,590	3,050	7,520	3,965	3,980	1,745	1,075	1,674	8,450	10,168	5,460
4.2	210	3,890	3,440	8,010	4,375	4,120	1,845	1,141	1,782	9,270	11,052	5,920
4.4	270	4,190	3,840	8,520	4,785	4,260	1,945	1,207	1,890	10,100	11,936	6,410
4.6	340	4,490	4,240	9,040	5,195	4,400	2,045	1,274	1,994	10,960	12,820	6,910
4.8	420	4,810	4,640	9,560	5,605	4,540	2,155	1,342	2,102	11,880	13,704	7,410
5.0	500	5,130	5,060	10,080	6,015	4,680	2,265	1,410	2,210	12,800	14,588	7,910
5.5	750	6,010	6,060	11,380	7,040	5,055	2,565	1,590	2,470	15,250	16,798	9,200
6.0	1,020	6,910	7,210	12,680	8,065	5,430	2,865	1,780	2,740	18,000	19,008	11,000
6.5	1,450	7,870	8,410	14,030	9,090	5,830	3,205	1,980	3,010	21,000	21,218	13,135
7.0	1,880	8,900	9,660	15,380	10,115	6,230	3,580	2,190	3,280	24,060	23,428	15,270
7.5	2,310	9,970	10,910	16,730	11,140	6,705	3,955	2,415	3,550	27,130	25,638	17,420
8.0	2,740	11,070	12,190	18,080	12,165	7,200	4,330	2,645	3,822	30,425	27,848	19,570
8.5	3,170	.....	13,490	.....	.....	7,700	4,745	2,895	4,102	33,750	30,058	21,745
9.0	3,600	.....	14,790	.....	.....	8,200	5,160	3,160	4,382	37,125	32,268	23,920
9.5	4,030	.....	16,090	.....	.....	8,730	5,575	3,435	4,672	40,500	34,478	26,095
10.0	4,460	.....	17,420	.....	.....	9,280	5,990	3,710	4,955	43,950	36,688	28,270
10.5	4,890	.....	18,770	.....	.....	9,830	6,405	4,000	5,245	47,560	38,898	30,520
11.0	5,320	.....	20,120	.....	.....	10,380	6,820	4,305	5,535	51,250	41,108	32,770
11.5	5,750	.....	21,520	.....	.....	10,955	7,235	4,630	5,833	55,000	43,318	35,020
12.0	6,180	.....	22,920	.....	.....	11,530	7,650	4,965	6,133	58,750	45,528	37,270
12.5	6,610	.....	24,320	.....	.....	12,105	8,070	5,325	6,433	62,625	.....	39,520
13.0	7,040	.....	25,720	.....	.....	12,680	8,490	5,700	6,733	66,525	.....	41,770
13.5	7,470	.....	27,120	.....	.....	13,255	8,925	6,075	7,033	70,425	.....	44,020
14.0	7,900	.....	28,530	.....	.....	13,830	9,370	6,465	7,333	74,325	.....	46,270
14.5	8,330	.....	29,930	.....	.....	14,405	9,820	6,855	7,633	78,375	.....	48,520
15.0	8,760	.....	31,330	.....	.....	15,000	10,270	7,250	7,933	82,500	.....	50,770
15.5	9,190	.....	32,730	.....	.....	15,600	10,720	7,650	8,233	86,625	.....	53,020
16.0	9,620	.....	34,130	.....	.....	16,200	11,170	8,050	8,541	90,750	.....	55,270
17.0	10,480	.....	.....	.....	.....	17,430	12,070	8,880	9,161	99,600	.....	59,770
18.0	11,340	.....	.....	.....	.....	18,680	12,970	9,710	9,781	108,200	.....	64,270
19.0	.....	.....	.....	.....	.....	20,080	13,870	10,540	10,401	116,800	.....	68,770
20.0	.....	.....	.....	.....	.....	22,000	14,850	11,370	11,569	.....	.....	73,270
25.0	.....	.....	.....	.....	.....	40,400	.....	.....	18,364	.....	.....	.....
30.0	.....	.....	.....	.....	.....	.....	.....	.....	25,159	.....	.....	.....
35.0	.....	.....	.....	.....	.....	.....	.....	.....	33,600	.....	.....	.....
40.0	.....	.....	.....	.....	.....	.....	.....	.....	44,000	.....	.....	.....
45.0	.....	.....	.....	.....	.....	.....	.....	.....	54,500	.....	.....	.....
50.0	.....	.....	.....	.....	.....	.....	.....	.....	65,000	.....	.....	.....

a Continued: Gage height —0.2, discharge 134; gage height 0.0, discharge 230.

b Continued: Gage height —0.2, discharge 113; gage height 0.0, discharge 120.

Rating tables for stations in South Carolina and Georgia.

[Numbers in box heads refer to pages in Water-Supply Paper No. 48.]

Gage height, in feet.	Discharge, in second-feet.									
	Saluda River at Waterloo, S. C. (147).	Tallulah River at Tallulah Falls, Ga. (148).	Tugaloo River near Madison, S. C. (149).	Savannah River near Calhoun Falls, S.C. (149).	Savannah River at Augusta, Ga. (150).	Broad River (of Georgia) near Carlton, Ga. (151).	Oconee River near Dublin, Ga. (152).	Yellow River at Almon, Ga. (153).	Towaliga River near Juliette, Ga. (154).	Ocmulgee River at Macon, Ga. (155).
0.8							1,015			
1.0							1,095			
1.2							1,185			
1.4							1,300			
1.6							1,425			
1.8							1,552			
2.0							1,681			
2.2							1,812			
2.4							1,945			
2.6							2,080			
2.8							2,218			
3.0							2,358			
3.2							2,500			
3.4							2,644			
3.6							2,790			
3.8							2,938			
4.0							3,089			
4.2							3,243			
4.4							3,400			
4.6							3,560			
4.8							3,720			
5.0							3,890			
5.2							4,070			
5.4							4,260			
5.6							4,460			
5.8							4,672			
6.0							4,888			
6.2							5,108			
6.4							5,332			
6.6							5,560			
6.8							5,788			
7.0							6,016			
7.2							6,244			
7.4							6,472			
7.6							6,700			
7.8							6,927			
8.0							7,158			
8.2							7,392			
8.4							7,628			
8.6							7,866			
8.8							8,106			
9.0							8,348			
9.2							8,592			
9.4							8,838			
9.6							9,086			
9.8							9,336			
10.0							9,588			
10.2							9,842			
10.4							10,098			
10.6							10,356			
10.8							10,616			
11.0							10,878			
11.2							11,142			
11.4							11,408			
11.6							11,676			
11.8							11,946			
12.0							12,218			
12.2							12,492			
12.4							12,768			
12.6							13,046			
12.8							13,326			
13.0							13,608			
13.2							13,892			
13.4							14,178			
13.6							14,466			
13.8							14,756			
14.0							15,048			
14.2							15,342			
14.4							15,638			
14.6							15,936			
14.8							16,236			
15.0							16,538			
15.2							16,842			
15.4							17,148			
15.6							17,456			
15.8							17,766			
16.0							18,078			
16.2							18,392			
16.4							18,708			
16.6							19,026			
16.8							19,346			
17.0							19,668			
17.2							19,992			
17.4							20,318			
17.6							20,646			
17.8							20,976			
18.0							21,308			
18.2							21,642			
18.4							21,978			
18.6							22,316			
18.8							22,656			
19.0							22,998			
19.2							23,342			
19.4							23,688			
19.6							24,036			
19.8							24,386			
20.0							24,738			
20.2							25,092			
20.4							25,448			
20.6							25,806			
20.8							26,166			
21.0							26,528			
21.2							26,892			
21.4							27,258			
21.6							27,626			
21.8							27,996			
22.0							28,368			
22.2							28,742			
22.4							29,118			
22.6							29,496			
22.8							29,876			
23.0							30,258			
23.2							30,642			
23.4							31,028			
23.6							31,416			
23.8							31,806			
24.0							32,198			
24.2							32,592			
24.4							32,988			
24.6							33,386			
24.8							33,786			
25.0							34,188			
25.2							34,592			
25.4							34,998			
25.6							35,406			
25.8							35,816			
26.0							36,228			
26.2							36,642			
26.4							37,058			
26.6							37,476			
26.8							37,896			
27.0							38,318			
27.2							38,742			
27.4							39,168			
27.6							39,596			
27.8							40,026			
28.0							40,458			
28.2							40,892			
28.4							41,328			
28.6							41,766			
28.8							42,206			
29.0							42,648			
29.2							43,092			
29.4							43,538			
29.6							43,986			
29.8							44,436			
30.0							44,888			

a Continued: Gage height — 1.2, discharge 890; gage height — 1.0, discharge 950.

Rating tables for stations in West Virginia, North Carolina, Tennessee, Georgia, and Ohio.

[Numbers in box heads refer to pages in Water-Supply Papers Nos. 48 and 49.]

Gage height, in feet.	Discharge, in second-feet.									
	Greenbrier River at Alderson, W. Va. (178).	New River at Fayette, W. Va. (181).	French Broad River near Asheville, N. C. (186).	Tuckasee River at Bryson, N. C. (188).	Little Tennessee River at Judson, N. C. (189).	Hivasssee River at Murphy, N. C. (190).	Hivasssee River at Reliance, Tenn. (191).	Hivasssee River at Charleston, Tenn. (192).	Toccoa River near Blue-ridge, Ga. (193).	Tennessee River at Chattanooga, Tenn. (195).
0.0		1,840								
0.2		1,960						1,200		
0.4		2,080						1,380		
0.6		2,240						1,580		
0.8		2,400						1,820		
1.0		2,560		300			1,030	2,100	6,600	
1.2	60	2,750		500			1,180	2,400	7,300	
1.4	120	2,950		700			1,415	2,710	8,040	8
1.6	220	3,160		950			1,750	3,040	8,820	55
1.8	350	3,380					2,100	3,370	9,620	145
2.0	505	3,610	800	1,200			2,450	3,700	10,430	247
2.2	685	3,850	890	1,510			2,800	4,030	11,250	365
2.4	920	4,100	1,020	1,850			3,150	4,360	12,080	494
2.6	1,205	4,380	1,190	2,190	325		3,500	4,690	12,930	795
2.8	1,535	4,690	1,380	2,540	427		3,850	5,020	13,800	978
3.0	1,900	5,030	1,610	2,900	596		4,200	5,350	14,680	1,185
3.2	2,330	5,290	1,880	3,260	828		4,550	5,680	15,600	1,415
3.4	2,770	5,650	2,190	3,650	1,060		4,900	6,010	16,550	1,535
3.6	3,240	6,010	2,530	4,075	1,310		5,250	6,340	17,550	1,850
3.8	3,720	6,370	2,900	4,550	1,595		5,600	6,670	18,550	2,090
4.0	4,200	6,730	3,290	5,125	2,315		5,950	7,000	19,600	2,330
4.2	4,680	7,090	3,710	5,750	2,695		6,300	7,330	20,800	2,580
4.4	5,160	7,460	4,210	6,400	3,075		6,650	7,660	22,040	2,850
4.6	5,660	7,860	4,760	7,050	3,455	240		7,990	23,280	3,135
4.8	6,180	8,260	5,350	7,700	3,850	310		8,320	24,520	3,445
5.0	6,700	8,660	6,000	8,350	4,250	415		8,650	25,760	3,789
5.5	8,000	9,730	7,750	9,000	4,650	745		9,475	27,000	4,135
6.0	9,500	10,880	9,500	10,950	5,050	1,325		10,300	28,240	4,505
6.5	11,000	12,030	11,250	13,450	5,450	2,200		11,125	30,100	5,905
7.0	12,500	13,250	13,000	16,300	5,850	3,075		11,950	33,200	6,795
7.5	14,000	14,530	14,750	19,175	6,250	3,950		12,775	36,300	7,685
8.0	15,600	15,830	16,500	22,050	6,650	4,825		13,600	39,400	
8.5	17,300	17,130	18,250	24,925	7,050	5,700		14,425	42,500	
9.0	19,000	18,480	20,000	27,800	7,450	6,600		15,250	45,600	
9.5	20,700	19,870		30,675	7,850	7,500		16,075	48,700	
10.0	22,500	21,310		33,550	8,250	8,400		16,900	51,800	9
11.0	26,500	24,480		38,425	8,650	9,300		17,725	54,900	91
12.0	31,200	27,900		42,300	9,050	10,200		18,550	58,000	275
13.0	36,200	31,500			9,450	11,100		19,375	61,100	778
14.0	41,200	35,160			9,850	12,000		20,200	64,200	1,440
15.0	46,200	38,960			10,250	13,800			67,300	2,240
16.0					10,650	15,600			70,400	3,300
17.0					11,050	17,400			73,500	4,580
18.0					11,450	19,200			76,600	6,130
19.0					11,850	21,000			79,700	8,000
20.0					12,250	22,800			82,800	
22.0					13,050	24,600			85,900	
24.0					13,850				89,000	
26.0					14,650				92,100	
28.0					15,450				95,200	
30.0					16,250				98,300	
32.0					17,050				101,400	
34.0					17,850				104,500	
36.0					18,650				107,600	
38.0					19,450				110,700	
40.0					20,250				113,800	
					21,050				116,900	
					21,850				120,000	
					22,650				123,100	
					23,450				126,200	
					24,250				129,300	
					25,050				132,400	
					25,850				135,500	
					26,650				138,600	
					27,450				141,700	
					28,250				144,800	
					29,050				147,900	
					29,850				151,000	
					30,650				154,100	
					31,450				157,200	
					32,250				160,300	
					33,050				163,400	
					33,850				166,500	
					34,650				169,600	
					35,450				172,700	
					36,250				175,800	
					37,050				178,900	
					37,850				182,000	
					38,650				185,100	
					39,450				188,200	
					40,250				191,300	
					41,050				194,400	
					41,850				197,500	
					42,650				200,600	
					43,450				203,700	
					44,250				206,800	
					45,050				209,900	
					45,850				213,000	
					46,650				216,100	
					47,450				219,200	
					48,250				222,300	
					49,050				225,400	
					49,850				228,500	
					50,650				231,600	
					51,450				234,700	
					52,250				237,800	
					53,050				240,900	
					53,850				244,000	

Rating tables for stations in Montana and Wyoming.

[Numbers in box heads refer to pages in Water-Supply Paper No. 49.]

Gage height, in feet.	Discharge, in second-feet.											
	West Gallatin River near Salesville, Mont. (260).	Middle Creek near Bozeman, Mont. (261).	Gallatin River at Logan, Mont. (262).	Madison River near Redbluff, Mont. (263).	Jefferson River at Sappington, Mont. (264).	Missouri River at Townsend, Mont. (265).	Milk River at Havre, Mont. (267).	Yellowstone River near Livingston, Mont. (268).	Bighorn River near Thermopolis, Wyo. (269).	Grand Encampment Creek at Pervam's ranch, Wyo. (273).	Laramie River at Woods, Wyo. (273).	North Platte River near Guernsey, Wyo. (275).
0.0		48				a 1,620		b 2,150	c 210			d 1,060
0.2		88				1,825		2,375	400	10		1,340
0.4		153				2,090		2,605	620	80	45	1,620
0.6		232				2,415		2,855	940	195	60	1,920
0.8		321				2,810		3,130	1,340	395	85	2,220
1.0		417				3,255		3,420	1,770	630	125	2,520
1.2				860		3,825		3,730	2,210	885	200	2,820
1.4				1,230	305	4,450	12	4,075	2,650	1,160	290	3,120
1.6				1,640	435	5,140	30	4,440	3,090	1,470	410	3,430
1.8				2,075	600	5,880	50	4,830	3,530	1,820	550	3,770
2.0				2,530	775	6,650	76	5,275	3,970	2,185	720	4,150
2.2				3,005	980	7,440	109	5,740	4,410	2,585	960	4,570
2.4				3,515	1,205	8,265	149	6,220	4,850	3,005	1,240	5,020
2.6				4,040	1,455	9,140	189	6,730	5,290	3,425	1,530	5,485
2.8				4,570	1,725	10,010	248	7,270	5,730	3,845	1,820	5,955
3.0	330			5,110	2,020	10,955	315	7,840	6,170	4,265	2,110	6,430
3.2	440			5,655	2,325	11,825	396	8,470	6,610	4,685	2,400	6,910
3.4	560			6,220	2,645	12,730	485	9,140	7,050		2,690	7,390
3.6	700			6,810	2,980	13,690	587	9,860	7,490		2,980	7,870
3.8	850				3,330	14,600	700	10,660	7,930		3,270	8,350
4.0	1,020				3,690	15,525	820	11,540	8,370		3,560	8,830
4.2	1,200				4,050	16,460	940	12,485	8,810		3,850	9,310
4.4	1,405				4,410	17,340	1,070	13,475	9,250		4,140	9,790
4.6	1,630				4,780		1,205	14,530	9,690		4,430	
4.8	1,870				5,150		1,350	15,645	10,130			
5.0	2,125				5,520		1,500	16,875	10,570			
5.2	2,395				5,890		1,650		11,010			
5.4	2,685				6,270				11,450			
5.6	2,990				6,655							
5.8	3,300				7,045							
6.0	3,610				7,445							
6.2	3,925				7,845							
6.4	4,245				8,255							
6.6	4,570				8,665							
6.8	4,900				9,075							
7.0	5,240				9,485							
	5,580				9,905							

a Eighty-eight feet should be added to the gage heights for this station, making the first gage height read 88.0 instead of 0.0; the second 88.2 instead of 0.2, and so on.

b Continued: Gage height — 1.4, discharge 1,000; gage height — 1.20, discharge 1,120; gage height — 1.0, discharge 1,265; gage height — 0.8, discharge 1,420; gage height — 0.6, discharge 1,585; gage height — 0.4, discharge 1,760; gage height — 0.2, discharge 1,950.

c Continued: Gage height — 0.2, discharge 60.

d Continued: Gage height — 1.0, discharge 250; gage height — 0.8, discharge 370; gage height — 0.6, discharge 490; gage height — 0.4, discharge 610; gage height — 0.2, discharge 780.

Rating tables for stations in Colorado and Kansas.

[Numbers in box heads refer to pages in Water-Supply Papers Nos. 49 and 50.]

Discharge, in second-feet.												
Gage height, in feet.	South Platte River near Platte Canyon, Colo. (280).	South Platte River at Denver, Colo. (281).	South Platte River at Orchard, Colo. (282).	Bear Creek near Mor- rison, Colo. (284).	Clear Creek at Forks- creek, Colo. (285).	Boulder Creek near Boulder, Colo. (287).	St. Vrain Creek near Lyons, Colo. (288).	Big Thompson Creek near Arkins, Colo. (290).	Republican River at Junction, Kans. (313).	Solomon River near Niles, Kans. (314).	Saline River near Sa- lina, Kans. (315).	Smoky Hill River at Ellsworth, Kans. (316).
-0.2	a 109											
.0	133											
.2	160											
.4	190											
.6	225											
.8	267											
1.0	317		105	9								15
1.2	374		121	11								30
1.4	436		139	15	32							51
1.6	505		157	19	58							77
1.8	581		175	23	93							119
2.0	665		196	27	133							170
2.2	754		224	31	179							228
2.4	850		260	36	235							313
2.6	954		340	42	299							399
2.8	1,066		614	48	367							485
3.0	1,185		984	55	441							572
3.2	1,305		1,354	63	522							660
3.4	1,425		1,724	71	614							
3.6	1,545		2,094	80	719							
3.8	1,665		2,464	91	832							
4.0	1,785		2,834	103	946							
4.2	1,905		3,204	116	1,060							
4.4	2,025		3,574	131	1,174							
4.6	2,145		3,944	148	1,288							
4.8	2,265		4,314	169	1,402							
5.0	2,385	70	4,684	197								
5.2	2,505	113	5,054	232								
5.4	2,625	160	5,424	271								
5.6	2,745	213	5,794	316								
5.8		273	6,164	367								
6.0		341	6,534	421								
6.2		422	6,904	475								
6.4		551	7,274	529								
6.6		727	7,644	583								
6.8		903	8,014	637								
7.0		1,079	8,384	691								
7.2		1,255	8,754									
7.4		1,433	9,124									
7.6		1,755	9,494									
7.8		2,077	9,864									
8.0		2,399	10,234									
8.2		2,723	10,604									
8.4		3,047	10,974									
8.6		3,371	11,344									
8.8		3,695	11,714									
9.0		4,019	12,084									
9.2		4,343	12,454									
9.4		4,667	12,824									
9.6		4,991	13,194									
9.8		5,315	13,564									
10.0		5,639	13,934									
10.2												
10.4												
10.6												
10.8												
11.0												
11.2												
11.4												
11.6												
11.8												
12.0												
12.2												
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17.0												
17.2												
17.4												
17.6												
17.8												
18.0												
18.2												
18.4												
18.6												
18.8												
19.0												

a Continued: Gage height -1.0, discharge 33; gage height -0.8, discharge 50; gage height -0.6, discharge 68; gage height -0.4, discharge 87.

Rating tables for stations in Kansas and Colorado.

[Numbers in box heads refer to pages in Water-Supply Paper No. 50.]

	Discharge, in second-feet.										
Gage height, in feet.	Blue River near Manhattan, Kans. (317).	Kansas River at Le-compton, Kans. (318).	Lake Creek at Inter-laken station, Twin Lakes, Colo. (320).	Lake Creek below Twin Lakes, Colo. (320).	Arkansas River at Sallida, Colo. (322).	Arkansas River near Canyon, Colo. (323).	Arkansas River at Pueblo, Colo. (325).	Arkansas River near Nepesta, Colo. (326).	Arkansas River at Hutchinson, Kans. (330).	Verdigris River near Liberty, Kans. (330).	Neosho River near Iola, Kans. (331).
0.0											
0.2			36								
0.4			90		106						
0.6			155		191				14		
0.8			228		284				32		
1.0			308		392				35		
1.2					516				55		
1.4				35	654		174		86		
1.6				55	803		263		134	10	
1.8				82	954		358		210	27	
2.0				125	1,106	194	458		315	55	125
2.2				174	1,260	242	566		424	90	165
2.4				228	1,416	297	680		552	140	220
2.6		3,350		294	1,578	362	799		720	205	292
2.8		3,613			1,746	438	926	154	954	280	385
3.0	150	3,880			1,914	542	1,060	191	1,224	368	510
3.2	200	4,150			2,085	712	1,204	235	1,512	464	650
3.4	270	4,420			2,257	916	1,357	285	1,855	560	810
3.6	340	4,690			2,429	1,135	1,527	346	2,280	660	1,015
3.8	420	4,960			2,601	1,357	1,730	427	2,795	760	1,255
4.0	500	5,230			2,773	1,579	1,973	610	3,385	860	1,520
4.2	590	5,550			2,945	1,801	2,288	974	4,040	960	1,800
4.4	680	5,940			3,117	2,023	2,633	1,337	4,755	1,060	2,100
4.6	770	6,370			3,289	2,245	3,003	1,701	5,600	1,164	2,450
4.8	860	6,840			3,461	2,467	3,373	2,064	6,590	1,280	2,800
5.0	960	7,360			3,633	2,689	3,743	2,428	7,740	1,400	3,150
5.2	1,060	7,960				2,911	4,113	2,791	8,990	1,520	3,500
5.4	1,160	8,570				3,133	4,483	3,155	10,400	1,650	3,850
5.6	1,270	9,200				3,355	4,853	3,518	12,100	1,780	4,200
5.8	1,380	9,850				3,577	5,223	3,882		1,920	4,550
6.0	1,500	10,520				3,799	5,593	4,246		2,060	4,900
6.5	1,825	12,220				4,354	6,518	5,155		2,410	5,775
7.0	2,175	13,320				4,909		6,064		2,760	6,650
7.5	2,560	15,635						6,973		3,115	7,525
8.0	2,970	17,350						7,782		3,480	8,400
8.5	3,400	19,065						8,691		3,850	9,275
9.0	3,850	20,780						9,600		4,225	10,150
9.5	4,315	22,495								4,600	11,025
10.0	4,800	24,210								5,000	11,950
10.5	5,325									5,400	12,950
11.0	5,870									5,801	13,950
12.0	7,000									6,619	15,950
13.0	8,240									7,458	17,960
14.0	9,860									8,300	20,010
15.0	12,030									9,150	22,060
16.0	14,280									10,100	24,120
17.0	16,530									11,150	26,220
18.0	18,780									12,300	28,370
19.0	21,030										
20.0	23,280										
22.0	27,780										
28.0											
30.0											
32.0											
34.0											
36.0											

Rating tables for stations in Colorado, Wyoming, and Utah.

[Numbers in box heads refer to pages in Water-Supply Paper No. 50.]

Gage height, in feet.	Discharge, in second-feet.									
	Rio Grande near Del Norte, Colo. (347).	Concejos River near Los Mogotes, Colo. (348).	Rio Grande at Cenicero, Colo. (348).	Black Fork of Green River near Granger, Wyo. (367).	Ashley Creek near Ver-nal, Utah (368).	Uinta River near White-rocks, Utah (369).	Whiterocks River near Whiterocks, Utah (369).	Uinta River at Fort Duchesne, Utah (370).	Uinta River at Fort Duchesne, Utah (370).	Uinta River at Ouray School, Utah (371).
-0.2				27				(a)	(b)	28
0.0				55						40
0.2				100						56
0.4				190	32					92
0.6				310	43					134
0.8				430	72					179
1.0				550	112	115	36			221
1.2	140		43	670	152	155	61			263
1.4	258		79	810	152	260	97			309
1.6	384		142	970	200	370	135			375
1.8	518	251	236	1,130	260	515	195			463
2.0	660	331	414	1,290	322	695	286			551
2.2	812	419	594	1,450	387	875	377		8	639
2.4	978	522	774	1,610	452	1,055	468		25	727
2.6	1,149	638	954	1,770	517	1,235	559	85	55	815
2.8	1,329		1,134	1,930	582		650	128	90	903
3.0	1,522		1,314	2,090	647		741	175	140	991
3.2	1,734		1,494		712		832	265	230	1,079
3.4	1,968		1,674		777		923	375	350	1,167
3.6	2,216		1,854		842		1,014	485	475	1,255
3.8	2,478		2,034		907		1,105	680	680	1,343
4.0	2,754		2,214		972		1,196	940	940	1,431
4.2	3,054		2,394					1,270		
4.4	3,354		2,574					1,660		
4.6	3,654		2,754					2,050		
4.8	3,954		2,934					2,440		
5.0	4,254		3,114					2,830		
5.2	4,554		3,294							255
5.4	4,854									300
5.6	5,154									370
5.8	5,454									480
6.0	5,754									600
6.2										740
6.4										900
6.6										1,070
6.8										1,280
7.0										1,520
7.2										1,770
7.4										2,050
7.6										2,370
7.8										2,730
8.0										3,090
8.2										3,450
8.4										3,810
8.6										4,170
8.8										4,530
9.0										4,890
9.2										5,250
9.4										5,610
9.6										5,970
9.8										6,330
										6,690

a Applicable from September 1, 1899, to May 31, 1900.

b Applicable from June 1, 1900, to December 31, 1900.

Rating tables for stations in California, Nevada, Idaho, and Utah.

[Numbers in box heads refer to pages in Water-Supply Paper No. 51.]

Gage height, in feet.	Discharge, in second-feet.									
	Truckee River at Nevada-California State line (443).	Truckee River at Vista, Nev. (404).	Steamboat Creek at Steamboat Springs, Nev. (406).	Bear River at Battlement creek, Idaho (400).	Cub River at Franklin, Idaho (410).	Logan River near Logan, Utah (411).	Blacksmith Fork at Hyrum, Utah (412).	Bear River near Collins-ton, Utah (413).	Weber River near Uinta, Utah (414).	Provo River near Provo, Utah (416).
0.0										
0.2										
0.4										
0.6										
0.8										
1.0										
1.2										
1.4										
1.6										
1.8	205	16								
2.0	204	48								
2.2	328	105								
2.4	401	188								
2.6	486	283								
2.8	582	380								
3.0	683	479								
3.2	788	580								
3.4	897	683								
3.6	1,010	789								
3.8	1,131	898								
4.0	1,264	1,009								
4.2	1,409	1,123								
4.4	1,566	1,239								
4.6	1,725	1,357								
4.8	1,885	1,477								
5.0										
5.2										
5.4										
5.6										
5.8										
6.0										
6.2										
6.4										
6.6										

Rating tables for stations in Washington and California.

[Numbers in box heads refer to pages in Water-Supply Paper No. 51.]

Gage height, in feet.	Discharge, in second-feet.									
	Elwha River at McDon- ald, Wash. (447).	Calowa River near Forks, Wash. (448).	Soleduck River near Quillayute, Wash. (449).	Sacramento River at Jellys Ferry, Cal. (450).	Salinas River near Sal- inas, Cal. (451).	Stanislaus River near Oakdale, Cal. (455).	Tuolumne River at La- grange, Cal. (456).	San Joaquin River at Herndon, Cal. (458).	San Joaquin River at Herndon, Cal. (458).	King River near Red Mountain, Cal. (459).
1.0	-----	a 330	192	-----	-----	-----	-----	(b)	(c)	-----
1.2	-----	400	230	-----	-----	-----	-----	-----	-----	-----
1.4	-----	485	270	-----	-----	-----	-----	-----	-----	-----
1.6	510	575	310	-----	-----	-----	-----	-----	-----	-----
1.8	550	665	360	-----	-----	-----	-----	-----	-----	10
2.0	610	755	410	-----	-----	-----	-----	-----	-----	14
2.2	690	850	470	-----	-----	-----	-----	60	160	20
2.4	780	950	530	-----	-----	-----	-----	100	200	27
2.6	900	1,050	590	-----	-----	-----	-----	170	300	37
2.8	1,025	1,160	660	-----	-----	-----	-----	280	430	52
3.0	1,175	1,270	730	-----	-----	-----	-----	445	630	71
3.2	1,360	1,380	800	-----	-----	-----	2	640	870	92
3.4	1,647	1,500	880	-----	-----	-----	7	850	1,110	114
3.6	1,973	1,630	960	-----	6	-----	25	1,060	1,350	180
3.8	2,299	1,765	1,045	-----	10	-----	45	1,285	1,590	250
4.0	2,625	1,910	1,135	-----	15	-----	85	1,520	1,830	320
4.2	2,951	2,070	1,225	2,400	25	30	140	1,765	2,070	400
4.4	3,277	2,250	1,325	2,970	40	70	250	2,030	2,310	480
4.6	3,603	2,430	1,425	3,290	65	150	410	2,315	2,550	572
4.8	3,929	2,615	1,535	3,630	105	230	570	2,620	2,790	676
5.0	4,255	2,805	1,650	3,980	173	310	750	2,940	3,080	780
5.2	4,581	3,000	1,775	4,360	285	420	950	3,275	3,290	908
5.4	4,907	3,200	1,905	4,760	455	540	1,180	3,620	3,620	1,036
5.6	5,233	3,400	2,050	5,170	650	680	1,440	3,985	3,985	1,170
5.8	5,559	3,600	2,215	5,590	850	820	1,740	4,370	4,370	1,310
6.0	5,885	3,800	2,390	6,030	1,050	960	2,080	4,775	-----	1,450
6.2	6,211	4,000	2,565	6,470	1,255	1,050	2,350	5,180	-----	1,590
6.4	6,537	4,200	2,740	6,910	1,450	1,150	2,620	5,585	-----	1,730
6.6	6,863	4,400	2,915	7,350	1,645	1,250	2,890	5,990	-----	1,870
6.8	7,189	4,600	3,090	7,790	1,840	1,350	3,160	6,395	-----	2,010
7.0	7,515	4,800	3,265	8,230	2,035	1,450	3,430	6,800	-----	2,150
7.2	7,841	5,000	3,440	8,670	2,230	1,550	3,700	7,205	-----	2,290
7.4	8,167	5,200	3,615	9,110	2,425	1,650	3,970	7,610	-----	2,430
7.6	8,493	5,400	3,790	9,550	2,620	1,750	4,240	8,015	-----	2,570
7.8	8,819	5,600	3,965	10,000	2,815	1,850	4,510	8,420	-----	2,710
8.0	9,145	5,800	4,140	10,440	3,010	1,950	4,780	8,825	-----	2,850
8.2	9,471	6,000	4,315	10,880	3,205	2,050	5,050	9,230	-----	2,990
8.4	9,797	6,200	4,490	11,320	3,400	2,150	5,320	9,635	-----	3,130
8.6	10,123	6,400	4,665	11,760	3,595	2,250	5,590	10,040	-----	3,270
8.8	10,449	6,600	4,840	12,200	3,790	2,350	5,860	10,445	-----	3,410
9.0	10,775	6,800	5,015	12,640	3,985	2,450	6,130	10,850	-----	3,550
9.2	11,101	7,000	5,190	13,080	4,180	2,550	6,400	11,255	-----	3,690
9.4	11,427	7,200	5,365	13,520	4,375	2,650	6,670	11,660	-----	3,830
9.6	11,753	7,400	5,540	13,960	4,570	2,750	6,940	12,065	-----	3,970
9.8	12,079	7,600	5,715	14,400	4,765	2,850	7,210	12,470	-----	4,110
10.0	12,405	7,800	5,890	14,840	4,960	2,950	7,480	12,875	-----	4,250
10.2	12,731	8,000	6,065	15,280	5,155	3,050	7,750	13,280	-----	4,390
10.4	13,057	8,200	6,240	15,720	5,350	3,150	8,020	13,685	-----	4,530
10.6	13,383	8,400	6,415	16,160	5,545	3,250	8,290	14,090	-----	4,670
10.8	13,709	8,600	6,590	16,600	5,740	3,350	8,560	14,495	-----	4,810
11.0	14,035	8,800	6,765	17,040	5,935	3,450	8,830	14,900	-----	4,950
11.2	-----	9,000	6,940	17,480	6,130	3,550	9,100	15,305	-----	5,090
11.4	-----	9,200	7,115	17,920	6,325	3,650	9,370	15,710	-----	5,230
11.6	-----	9,400	7,290	18,360	6,520	3,750	9,640	16,115	-----	5,370
11.8	-----	9,600	7,465	18,800	6,715	3,850	9,910	16,520	-----	5,510
12.0	-----	9,800	7,640	19,240	6,910	3,950	10,180	16,925	-----	5,650
12.2	-----	10,000	7,815	19,680	7,105	4,050	10,450	17,330	-----	5,790
12.4	-----	10,200	7,990	20,120	7,300	4,150	10,720	17,735	-----	5,930
12.6	-----	10,400	8,165	20,560	7,495	4,250	11,000	18,140	-----	6,070
12.8	-----	10,600	8,340	21,000	7,690	4,350	11,270	18,545	-----	6,210
13.0	-----	10,800	8,515	21,440	7,885	4,450	11,540	18,950	-----	6,350
13.2	-----	-----	8,690	21,880	8,080	4,550	11,810	19,355	-----	6,490
13.4	-----	-----	8,865	22,320	8,275	4,650	12,080	19,760	-----	6,630
13.6	-----	-----	9,040	22,760	8,470	4,750	12,350	20,165	-----	6,770
13.8	-----	-----	9,215	23,200	8,665	4,850	12,620	20,570	-----	6,910
14.0	-----	-----	9,390	23,640	8,860	4,950	12,890	20,975	-----	7,050
14.2	-----	-----	9,565	24,080	9,055	5,050	13,160	21,380	-----	7,190
14.4	-----	-----	9,740	24,520	9,250	5,150	13,430	21,785	-----	7,330
14.6	-----	-----	9,915	24,960	9,445	5,250	13,700	22,190	-----	7,470
14.8	-----	-----	10,090	25,400	9,640	5,350	13,970	22,595	-----	7,610
15.0	-----	-----	10,265	25,840	9,835	5,450	14,240	23,000	-----	7,750
15.2	-----	-----	10,440	26,280	10,030	5,550	14,510	23,405	-----	7,890
15.4	-----	-----	10,615	26,720	10,225	5,650	14,780	23,810	-----	8,030
15.6	-----	-----	10,790	27,160	10,420	5,750	15,050	24,215	-----	8,170
15.8	-----	-----	10,965	27,600	10,615	5,850	15,320	24,620	-----	8,310
16.0	-----	-----	11,140	28,040	10,810	5,950	15,590	25,025	-----	8,450
16.2	-----	-----	11,315	28,480	11,005	6,050	15,860	25,430	-----	8,590
16.4	-----	-----	11,490	28,920	11,200	6,150	16,130	25,835	-----	8,730
16.6	-----	-----	11,665	29,360	11,395	6,250	16,400	26,240	-----	8,870
16.8	-----	-----	11,840	29,800	11,590	6,350	16,670	26,645	-----	9,010
17.0	-----	-----	12,015	30,240	11,785	6,450	16,940	27,050	-----	9,150
17.2	-----	-----	12,190	30,680	11,980	6,550	17,210	27,455	-----	9,290
17.4	-----	-----	12,365	31,120	12,175	6,650	17,480	27,860	-----	9,430
17.6	-----	-----	12,540	31,560	-----	6,750	17,750	28,265	-----	9,570
17.8	-----	-----	12,715	32,000	-----	6,850	18,020	28,670	-----	9,710
18.0	-----	-----	12,890	32,440	-----	6,950	18,290	29,075	-----	9,850
18.2	-----	-----	13,065	32,880	-----	7,050	18,560	29,480	-----	9,990
18.4	-----	-----	13,240	33,320	-----	7,150	18,830	29,885	-----	10,130
18.6	-----	-----	13,415	33,760	-----	7,250	19,100	30,290	-----	10,270
18.8	-----	-----	13,590	34,200	-----	7,350	19,370	30,695	-----	10,410
19.0	-----	-----	13,765	34,640	-----	7,450	19,640	31,100	-----	10,550
19.2	-----	-----	13,940	35,080	-----	7,550	19,910	31,505	-----	10,690
19.4	-----	-----	14,115	35,520	-----	7,650	20,180	31,910	-----	10,830
19.6	-----	-----	14,290	35,960	-----	7,750	20,450	32,315	-----	10,970
19.8	-----	-----	14,465	36,400	-----	7,850	20,720	32,720	-----	11,110
20.0	-----	-----	14,640	36,840	-----	7,950	21,000	33,125	-----	11,250
20.2	-----	-----	14,815	37,280	-----	8,050	21,270	33,530	-----	11,390
20.4	-----	-----	14,990	37,720	-----	8,150	21,540	33,935	-----	11,530
20.6	-----	-----	15,165	38,160	-----	8,250	21,810	34,340	-----	11,670
20.8	-----	-----	15,340	38,600	-----	8,350	22,080	34,745	-----	11,810
21.0	-----	-----	15,515	39,040	-----	8,450	22,350	35,150	-----	11,950
21.2	-----	-----	15,690	39,480	-----	8,550	22,620	35,555	-----	12,090
21.4	-----	-----	15,865	39,920	-----	8,650	22,890	35,960	-----	12,230
21.6	-----	-----	16,040	40,360	-----	8,750	23,160	36,365	-----	12,370
21.8	-----	-----	16,215	40,800	-----	8,850	23,430	36,770	-----	12,510
22.0	-----	-----	16,390	41,240	-----	8,950	23,700	37,175	-----	12,650
22.2	-----	-----	16,565	41,680	-----	9,050	23,970	37,580	-----	12,790
22.4	-----	-----	16,740	42,120	-----	9,150	24,240	37,985	-----	12,930
22.6	-----	-----	16,915	42,560	-----	9,250	24,510	38,390	-----	13,070
22.8	-----	-----	17,090	43,000	-----	9,350	24,780	38,795	-----	13,210
23.0	-----	-----	17,265	43,440	-----	9,450	25,050	39,200	-----	13,350
23.2	-----	-----	17,440	43,880	-----	9,550	25,320	39,605	-----	13,490
23.4	-----	-----	17,615	44,320	-----	9,650	25,590	40,010	-----	13,6

DRAINAGE AREAS.

The following table gives the areas of the drainage basins of rivers mentioned in this and other reports of the Division of Hydrography. A similar table was printed in Water-Supply Paper No. 11, pages 95 to 100. Most of the areas have been obtained by planimeter measurement of the best maps available, the topographic atlas sheets of the United States Geological Survey being used for such drainage basins as have been mapped.

Drainage areas of streams in the United States.

	Square miles.
Alabama River at Montgomery, Alabama.....	13, 500
Alabama River at Selma, Alabama.....	15, 400
Allegheny River at Warren, Pennsylvania.....	3, 057
Allegheny River at Oil City, Pennsylvania.....	4, 526
Allegheny River at Parkers Landing, Pennsylvania.....	6, 019
Allegheny River at Mahoning, Pennsylvania.....	6, 964
Allegheny River at Freeport, Pennsylvania.....	9, 219
Allegheny River at Pittsburg, Pennsylvania.....	16, 992
Allegheny River at mouth, Pennsylvania.....	11, 400
Allens Creek (tributary of Genesee River) at mouth, New York.....	198
American Fork near American Fork, Utah.....	66
Androscoggin River below junction of Umbagog Outlet and Magalloway River, Maine.....	1, 180
Androscoggin River at Berlin Falls, Maine.....	1, 480
Androscoggin River at Rumford Falls, Maine.....	2, 320
Androscoggin River at Livermore Falls, Maine.....	2, 690
Androscoggin River at Lewiston, Maine.....	3, 120
Androscoggin River at Brunswick, Maine.....	3, 700
Angelica Creek (tributary of Genesee River) at mouth, New York.....	82
Animas River at Durango, Colorado.....	812
Antietam Creek at Sharpsburg, Maryland.....	293
Arkansas River, East Fork, near Leadville, Colorado.....	44
Arkansas River, Lake Fork, near Leadville, Colorado.....	21
Arkansas River, Tennessee Fork, near Leadville, Colorado.....	44
Arkansas River at Granite, Colorado.....	425
Arkansas River at Salida, Colorado, above South Fork.....	1, 160
Arkansas River at Canyon, Colorado.....	3, 060
Arkansas River at Swallows, Colorado.....	4, 300
Arkansas River at Rock Canyon, Colorado.....	4, 560
Arkansas River at Pueblo, Colorado.....	4, 600
Arkansas River at Nepesta, Colorado.....	9, 130
Arkansas River at Rockyford, Colorado.....	11, 440
Arkansas River at La Junta, Colorado, including Fountain Creek drainage (1,011).....	12, 200
Arkansas River at Lamar, Colorado.....	19, 367
Arkansas River at Granada, Colorado.....	23, 478
Arkansas River at railroad bridge above Holly, Colorado, including Animas River drainage (3,337).....	23, 500
Arkansas River at Colorado-Kansas State line.....	24, 600
Arkansas River at Hutchinson, Kansas.....	34, 000
Arkansas River in Colorado.....	30, 720
Arkansas River in Kansas.....	7, 040
	<hr/> 37, 760

	Square miles.
Ashley Creek (tributary of Green River) at the canyon, Utah.....	250
Avery Creek (tributary of French Broad River) at bridge on road from Mills River to Asheville, North Carolina.....	8
Bald Creek (tributary of Nolichucky River) at mouth, North Carolina...	15
Bald Mountain Creek 1 mile above mouth, North Carolina.....	16
Basin Creek (tributary of Caliente Creek), California.....	96
Battenkill River at mouth, New York.....	438
Battle Creek at Battlecreek, Michigan.....	180
Battle Creek at mouth, Michigan.....	244
Bear Creek at Morrison, Colorado.....	170
Bear Creek (tributary of Nolichucky River) at Flat Rock, North Carolina...	10
Bear Creek (tributary of Holston River) at mouth, Virginia.....	17
Bear River at Soda Springs, Idaho.....	3,940
Bear River at Battlecreek, Idaho.....	4,500
Bear River at Collinston, Utah.....	6,000
Beards Creek (tributary of Genesee River) at mouth, New York.....	41
Beaver Creek (tributary of New River) at mouth, North Carolina.....	16
Beaver Creek (tributary of Nolichucky River) at mouth, near Sprucepine, North Carolina.....	6
Beaver Dam Creek (tributary of French Broad River) 50 yards above mouth, North Carolina.....	14
Beaver Dam Creek (tributary of Watauga River) at Leander, North Caro- lina.....	21
Beaver Dam Creek (tributary of Holston River) at Damascus, Virginia...	57
Beaverkill Creek (tributary of Delaware River) at mouth, New York....	322
Beaver River above Beaver, New York.....	153
Beaver River below Beaver, New York.....	169
Beaver River at mouth, New York.....	322
Beech Creek (tributary of Watauga River) above mouth of Fogey Creek, North Carolina.....	16
Big Bugaboo Creek (tributary of Yadkin River) at ford on road from Roar- ing River to Elkin, North Carolina.....	17
Big Elkin Creek (tributary of Yadkin River) at railroad trestle at Elkin, North Carolina.....	35
Big Goose Creek at Sheridan, Wyoming, below mouth of Little Goose Creek.....	320
Bighorn River at Thermopolis, Wyoming.....	8,184
Big Ivy Creek (tributary of French Broad River) one-eighth mile below mouth of Bull Creek, North Carolina.....	158
Big Laurel Creek (tributary of New River) at mouth, North Carolina...	29
Big Pine Creek (tributary of French Broad River) above mouth, North Carolina.....	16
Big Rock Creek (tributary of Nolichucky River) at ford on Hunt Dale- Bakersville road, North Carolina.....	60
Big Sandy Creek at Dadeville, Alabama.....	195
Big Thompson Creek at Arkins, Colorado.....	305
Bitterroot River at Missoula, Montana.....	3,260
Black Creek, Upper (tributary of Genesee River), at mouth, New York...	39
Black Creek, Lower (tributary of Genesee River), at mouth, New York...	212
Black River at Forestport, New York.....	268
Black River at Lyons Falls, below Moore River, New York.....	810
Black River at Carthage, New York.....	1,741
Black River at Watertown, New York, gaging station.....	1,899
Black River at mouth, New York.....	1,930

Square miles.

Blackfoot River foot marshes in sec. 12, T. 5 S., R. 40 E., Idaho.....	666
Blackfoot River at Bonner, Montana.....	2,465
Black Fork of Green River 3 miles west of Granger, Wyoming.....	1,747
Black Fork of Green River at Granger, Wyoming, including Hams Fork.....	2,400
Blacksmith Fork at Hyrum, Utah.....	286
Black Warrior River at Tuscaloosa, Alabama.....	4,900
Blue River at Manhattan, Kansas.....	9,490
Blue River in Kansas.....	2,450
Blue River in Nebraska.....	7,040
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Boardman River at Traverse, Michigan.....	9,490
Boise River at Boise, Idaho.....	295
Boise River at Caldwell, Idaho.....	2,450
Boise River at Caldwell, Idaho.....	3,360
Boone Fork of Watauga River at Shull's mill, North Carolina.....	9
Boulder Creek at Boulder, Colorado.....	179
Bowlen Creek (tributary of Nolichucky River) near Burnsville, North Carolina.....	6
Boylston Creek (tributary of French Broad River) at bridge near mouth, North Carolina.....	17
Broad River, South Fork, at mouth, Georgia.....	215
Broad River, North Fork, at Carlton, Georgia.....	762
Broad River at bridge above mouth of Buffalo Creek, North Carolina.....	72
Broad River at Gaffney, South Carolina.....	1,435
Broad River at Alston, South Carolina.....	4,609
Brown Creek (tributary of Nolichucky River) at ford on Marion-Micaville road, North Carolina.....	2
Bruneau River at Grandview, Idaho.....	1,800
Brush Creek (tributary of Watauga River) near Carter, Tennessee.....	15
Buck Creek (tributary of Catawba River) near mouth, North Carolina.....	33
Buffalo Creek (tributary of Broad River) at main ford, North Carolina.....	11
Buffalo Creek (tributary of New River) one-eighth mile above mouth, North Carolina.....	24
Buffalo Creek (tributary of Watauga River) at mouth, Tennessee.....	39
Butternut Creek (tributary of Susquehanna River) at mouth, New York.....	123
Byars Creek (tributary of Holston River) at mouth, Virginia.....	8
Cache la Poudre River at Fort Collins, Colorado.....	1,060
Caliente Creek, California:	
Tehachapi Creek.....	108
Caliente Creek proper.....	219
Basin Creek.....	96
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Calowa River at Forks, Washington.....	423
Canadaway Creek, West Branch, above Fredonia, New York.....	213
Canadian River in Kansas.....	4
Canadian River in New Mexico.....	5,110
Canadian River in New Mexico.....	16,900
Canadian River in Texas.....	18,620
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Canandaigua Outlet at inlet, head of Canandaigua Lake, New York.....	40,630
Canandaigua Outlet at foot of Canandaigua Lake, New York.....	85
Canandaigua Outlet at Phelps, New York.....	175
Canandaigua Outlet at junction with Mud Creek, New York.....	390
Canaseraga Creek (tributary of Genesee River) at mouth, New York.....	431
Cancomgomoc River at entrance into Chesuncook Lake, Maine.....	259
Caneadea Creek (tributary of Genesee River) at mouth, New York.....	230
	63

	Square miles.
Cane Creek (tributary of Nolichucky River) one-half mile above mouth, North Carolina	30
Cane Creek (tributary of Catawba River) near mouth, North Carolina ..	16
Caney Creek (tributary of French Broad River) at bridge near Westfall's place, North Carolina	88
Caney River (tributary of Nolichucky River) near Big Tom Wilson's, North Carolina	21
Caney River (tributary of Nolichucky River) 1½ miles above mouth, North Carolina	148
Caney River (tributary of Nolichucky River) at mouth near Hunt Dale, North Carolina	158
Canisteo River (tributary of Chemung River) at mouth, New York	780
Cape Fear River at Fayetteville, North Carolina	4,493
Carson River near Empire, Nevada	894
Carson River, East Fork, at Rodenbahs, Nevada	414
Carson River, West Fork, at Woodfords, California	70
Catawba River, North Fork, near mouth, North Carolina	84
Catawba River near Oldfort, North Carolina	12
Catawba River at Morganton, North Carolina	758
Catawba River at Lookout Shoals, North Carolina	1,424
Catawba River at Catawba, North Carolina	1,514
Catawba River at Fort Mill, South Carolina	2,987
Catherines Creek (tributary of Seneca River) at mouth, New York	94
Cathey Creek (tributary of French Broad River) at ford of Brevard- Jeptha road, North Carolina	11
Cattail Branch (tributary of Nolichucky River) near Burnsville, North Carolina	7
Cayadutta Creek below Johnstown, New York, gaging station	40
Cayadutta Creek at mouth, New York	62
Cayuga Inlet (tributary of Cayuga Lake, New York), including Cascadilla Creek	173
Cayuga Lake at outlet, New York	1,593
Cayuta Creek (tributary of Susquehanna River) at mouth, New York	148
Cazenovia Lake at outlet, New York	9
Cedar Creek (tributary of Holston River) at mouth, Virginia	6
Chama River at Abiquiu, New Mexico	2,300
Champlain Lake in New York	2,950
Champlain Lake in Vermont	4,270
Champlain Lake in Quebec	740
Champlain Lake, area of water surface	400
	8,360
Chattahoochee River at Oakdale, Georgia	1,560
Chattahoochee River at West Point, Georgia	3,300
Charlotte River (tributary of Susquehanna River) at mouth, New York ..	178
Chautauqua Outlet at Chautauqua Lake, New York	178
Chautauqua Outlet below Cassadaga Creek, New York	343
Cheat River at Ueva, West Virginia	1,375
Cheat River at Rowlesburg, West Virginia	886
Chemung River at junction of Canisteo and Cohocton rivers, New York ..	1,941
Chemung River at Elmira, New York	2,055
Chemung River at mouth, New York	2,518
Chenango River (tributary of Susquehanna River) above Canasawacta Creek, New York	297

Square miles.

Chenango River (tributary of Susquehanna River) above Tioughnioga, New York.....	685
Chenango River (tributary of Susquehanna River) at mouth, New York.....	1,540
Chenevas Creek (tributary of Susquehanna River) at mouth, New York.....	127
Chenunda Creek (tributary of Genesee River) at mouth, New York.....	30
Cherry Valley Creek (tributary of Susquehanna River) at mouth, New York.....	121
Cheyenne River in Montana.....	3,750
Cheyenne River in Nebraska.....	17,910
Cheyenne River in North Dakota.....	39,770
Cheyenne River in South Dakota.....	40,840
Cheyenne River in Wyoming.....	12,030
	114,300
Chittenango Creek at Bridgeport, New York, gaging station, including Cazenovia Lake.....	307
Chittenango Creek at mouth, New York.....	309
Chowchilla Creek above sec. 1, T. 9 S., R. 18 E., California.....	268
Cimarron River at Arkalon, Kansas.....	5,200
Clam Lakes at outlet, Michigan (water surface 6.7 square miles).....	67
Clam River at mouth, Michigan.....	307
Clarion River (tributary of Allegheny River) at Clarion, Pennsylvania.....	865
Clear Creek 4 miles west of Buffalo, Wyoming.....	118
Clear Creek at Forkscreek, Colorado, gaging station.....	345
Clear Creek near Granite, Colorado.....	72
Clear Creek (tributary of Catawba River) near mouth, North Carolina.....	3
Clyde River at Lyons, New York, junction of Canandaigua Outlet and Mud Creek.....	729
Clyde River at Clyde, New York.....	807
Clyde River at mouth, New York.....	869
Cobbosseecontee River near Augusta, Maine.....	230
Cohocton River (tributary of Chemung River) at mouth, New York.....	425
Cohocton River (tributary of Susquehanna River) at mouth, New York.....	425
Colbert Creek (tributary of Nolichucky River) at ford on Micaville-Marion road, North Carolina.....	2
Cold Creek (tributary of Genesee River) at mouth, New York.....	41
Colorado River at Austin, Texas.....	37,000
Colorado River in Arizona ¹	56,182
Colorado River in California ¹	8,610
Colorado River in Colorado ¹	5,490
Colorado River in Nevada ¹	3,200
Colorado River in New Mexico ¹	19,000
Colorado River in Utah ¹	21,633
	114,115
Colorado River at Yuma, Arizona.....	225,049
Columbia River in Idaho.....	7,880
Columbia River in Oregon.....	24,093
Columbia River in Montana.....	25,000
Columbia River in Washington.....	26,160
	81,133
Conasauga River at mouth, New York.....	723
Conejos River at Los Mogotes, Colorado.....	282
Conejos River at Conejos, Colorado.....	333

¹ Not including Grand, Green, nor Gila basins.

	Square miles.
Conesus Lake (tributary of Genesee River) at mouth, New York.....	89
Connecticut River at Holyoke, Massachusetts	8,660
Connecticut River at Hartford, Connecticut.....	10,234
Conemaugh River (tributary of Allegheny River) at Saltsburg, Pennsylvania.....	1,403
Conemaugh River (tributary of Allegheny River) at Johnstown, Pennsylvania.....	711
Coosa River at Rome, Georgia	4,006
Coosa River at Lock No. 4, Alabama	7,053
Coosa River at Riverside, Alabama	7,065
Coosa River at Lock No. 5, Alabama.....	7,648
Coosawattee River at Carters, Georgia	531
Coosawattee River at mouth, Georgia.....	885
Coquago Creek (tributary of Delaware River) at mouth, New York	82
Coshaqua Creek (tributary of Genesee River) at mouth, New York	82
Cottonwood Creek, South Fork, near Buena Vista, Colorado.....	28
Cottonwood Creek, Middle Fork, near Buena Vista, Colorado.....	37
Cove Creek (tributary of Green River) near mouth, North Carolina.....	7
Cove Creek (tributary of Watauga River) at mouth, North Carolina.....	39
Cove Creek (tributary of Broad River) at bridge on Rutherfordton road, North Carolina.....	78
Crabtree Creek (tributary of Nolichucky River) at ford on Burnsville-Sprucepine road, North Carolina.....	20
Crawford Creek (tributary of Genesee River) at mouth, New York	12
Crib Creek (tributary of Catawba River) near mouth, North Carolina	10
Croton River at old Croton Dam, New York	338
Croton River at new Croton Dam, New York	360
Cryder Creek (tributary of Genesee River) at mouth, New York	43
Cub River at Franklin, Idaho	53
Curtis Creek (tributary of Catawba River) near mouth, North Carolina	11
Dan River at South Boston, Virginia	2,750
Dan River at Clarksville, Virginia.....	3,798
Davidson River (tributary of French Broad River) at county bridge near mouth, North Carolina	48
Dead River at mouth, Maine.....	1,000
Deep River at Cumnock, North Carolina.....	1,110
Deep River at Moncure, North Carolina.....	1,400
Deer River (tributary of Black River) at mouth, New York	107
Delaware River, West Branch, at Deposit, below Coquago (Oquago) Creek, New York.....	519
Delaware River, West Branch, at mouth, New York.....	685
Delaware River above the mouth of Beaver Kill, New York	520
Delaware River below junction of East and West branches, New York	1,604
Delaware River below Port Jervis, New York.....	3,252
Delaware River below mouth of Neversink River, New York.....	3,600
Delaware River at Pennsylvania State line.....	2,580
Delaware River at Delaware Water Gap, Pennsylvania	4,176
Delaware River at Lambertville, New Jersey	6,855
Delaware River at mouth, Wilmington, Delaware	11,895
Denton Valley Creek (tributary of Holston River) at mouth, Virginia	12
Deschutes River at Moro, Oregon	9,900
Desplaines River at Riverside, Illinois	633
Doe Creek (tributary of Watauga River) one-half mile above mouth, Tennessee	43

	Square miles.
Doe River (tributary of Watauga River) 1 mile above Elizabethton, Tennessee.....	140
Doe River (tributary of Watauga River) at Allentown, Tennessee.....	72
Dolores River, West Fork, Colorado.....	160
Dolores River at Dolores, Colorado, gaging station.....	524
Dolores River at Dolores, Colorado, including Lost Canyon Creek (59)....	583
Dolores River at intake of ditch system, Colorado.....	586
Dowagiac River (tributary of St. Joseph River) at mouth, Michigan.....	281
Dry Gulch Creek (tributary of Duchesne River) at mouth, Utah.....	260
Duchesne River above Strawberry Creek, Utah.....	703
Duchesne River at Lake Fork, Utah.....	2,247
Duchesne River at Price road bridge, Utah.....	2,746
Duchesne River at mouth, Utah.....	3,985
Dungeness River at Sequim, Washington, gaging station.....	145
Dutch Creek (tributary of Watauga River) at Valle Cruces, North Carolina.....	11
Dykes Creek at mouth, New York.....	68
East branch or fork of any river, <i>see</i> the river.	
East Canada Creek at Dolgeville, New York.....	256
East Canada Creek at mouth, New York.....	283
Eaton Brook (tributary of Chenango River) at mouth, New York.....	11
Elk Creek (tributary of New River) at Elk crossroads, North Carolina.....	10
Elk Creek (tributary of New River) 200 yards above mouth, Virginia.....	82
Elk Creek, North Fork, at Banners Elk, North Carolina.....	4
Elk Creek, South Fork, at Banners Elk, North Carolina.....	7
Elk Creek (tributary of Watauga River) at Lineback, Tennessee.....	80
Elk Creek (tributary of Yadkin River) one-fourth mile above ford, North Carolina.....	52
Elk Fork Creek (tributary of Nolichucky River) near Big Tom Wilson's, North Carolina.....	3
Elkhart River at mouth, Indiana.....	500
Elkhorn River at Norfolk, Nebraska.....	2,474
Elkhorn River at Arlington, Nebraska.....	5,980
Elwha River at McDonald, Washington.....	188
Etowah River at Canton, Georgia.....	604
Etowah River at mouth, Rome, Georgia.....	1,854
Fall Creek, New York (tributary of Cayuga Lake), not including Cascadilla Creek.....	152
Fall River 5 miles above mouth, Idaho.....	594
Farm Creek (tributary of Duchesne River) at canyon, Utah.....	47
Fifteenmile Creek (tributary of Holston River) at mouth, Virginia.....	13
Fish Creek, East Branch, above Point Rock, New York.....	104
Fish Creek, West Branch, at McConnellsville, New York.....	187
Fish Creek (tributary of Oneida River) at junction with Hudson River, New York.....	253
Fish Creek (tributary of Oneida River) at mouth, New York.....	480
Fisher River (tributary of Yadkin River) at railroad trestle, North Carolina.....	155
Flannery Fork (tributary of New River) at ford on Boone River—Blowing Rock road, North Carolina.....	6
Flat Creek (tributary of Swannanoa River) 2 miles below Black Mountain Station, North Carolina.....	18
Flat Creek (tributary of French Broad River) at mouth, North Carolina.....	25
Flat River (tributary of Grand River) at mouth, Michigan.....	602

	Square miles.
Flint River at Molena, Georgia	892
Flint River at Woodbury, Georgia	988
Flint River at Albany, Georgia	5,000
Florida River at Stewart's ranch, 9 miles from Durango, Colorado	136
Fogey Creek (tributary of Watauga River) at mouth, North Carolina	3
Forge Creek (tributary of Watauga River) near mouth, Tennessee	18
Fort Tejon Creek, California, including Cuddy Creek and Castac Lake (upper basin, 56)	93
Fox Creek (tributary of New River) one-fourth mile above mouth, Vir- ginia	60
French Broad River, North Fork, above mouth of West Fork, North Carolina	36
French Broad River at crossing of Brevard-Webster road, North Carolina	26
French Broad River at ford on road between Tucker and Shoal creeks, North Carolina	19
French Broad River, East Fork, near mouth, North Carolina	26
French Broad River, Middle Fork, at bridge above ford, North Carolina	5
French Broad River, West Fork, at bridge near mouth, North Carolina	30
French Broad River at Eastatoe Bridge, North Carolina	67
French Broad River at bridge near Carson Creek, North Carolina	133
French Broad River at Penrose, North Carolina	294
French Broad River at Fanning Bridge, North Carolina	644
French Broad River at Asheville, North Carolina	987
French Broad River at Oldtown, Tennessee	1,737
French Broad River at mouth, Tennessee	5,133
Frenchman River at Wauneta, Nebraska	989
Frenchman River at Palisade, Nebraska	1,032
Fulton Chain above Old Forge, New York	41
Gallatin River at Logan, Montana	1,620
Gap Creek (tributary of New River) at mouth, North Carolina	11
Gap Creek (tributary of Watauga River) at mouth, Tennessee	10
Garoga Creek 3 miles above Mohawk River, New York	81
Genesee River below Cryder Creek, New York	143
Genesee River below Chenunda Creek, New York	211
Genesee River below Dykes Creek, New York	282
Genesee River below Vandemarck Creek, New York	323
Genesee River below Knights Creek, New York	346
Genesee River below Phillips Creek, New York	405
Genesee River below Van Campens Creek, New York	466
Genesee River below Angelica Creek, New York	563
Genesee River below White Creek, New York	585
Genesee River below Upper Black Creek, New York	627
Genesee River below Crawford Creek, New York	649
Genesee River below Caneadea Creek, New York	714
Genesee River below Cold Creek, New York	786
Genesee River below Rush Creek, New York	822
Genesee River below Wiscoy Creek, New York	942
Genesee River below Wolf Creek, New York	994
Genesee River below Silver Lake Creek, New York	1,060
Genesee River at Mount Morris, New York	1,070
Genesee River below Coshaqua Creek, New York	1,142
Genesee River below Canaseraga Creek, New York	1,407
Genesee River below Beards Creek, New York	1,464
Genesee River below Conesus Lake, New York	1,644

	Square miles.
Genesee River below Honeoye Creek, New York	1,939
Genesee River below Allens Creek, New York	2,145
Genesee River at Rochester, New York	2,365
Genesee River at mouth, New York	2,446
Genesee River below Black Creek, New York	2,380
Gila River at San Carlos, Arizona	13,455
Gila River at Buttes, Arizona	17,834
Gila River in Arizona, including small lost basins	56,838
Gila River in New Mexico, including small lost basins	14,300
	<hr/>
	71,138
Goose Creek at Lake Cheesman, Colorado, gaging station	86
Grand River at Glenwood Springs, Colorado	5,838
Grand River at Grand Junction, Colorado, above Gunnison River	8,644
Grand River at Grand Junction, Colorado, below Gunnison River, including Uncompahgre (497) and Gunnison at mouth (7,935)	16,579
Grand River in Colorado	22,294
Grand River in Utah	3,873
	<hr/>
	26,167
Grand River above Lansing, Michigan	756
Grand River at North Lansing dam, Michigan	1,168
Grand River below mouth of Red Cedar River, Michigan	1,229
Grand River at North Lansing, Michigan	1,238
Grand River above Portland, Michigan	1,404
Grand River below mouth of Lookingglass River, Michigan	1,710
Grand River above Lyons, Michigan	1,748
Grand River below mouth of Maple River, Michigan	2,667
Grand River at Ionia, Michigan	2,818
Grand River above Lovell, Michigan	2,971
Grand River below mouth of Flat River, Michigan	3,573
Grand River above Grand Rapids, Michigan	4,883
Grand River at C. and W. M. R. R. bridge, Grand Rapids, Michigan	4,900
Grand River at Brick House, Michigan, gaging station	4,961
Grand River at Lamont, Michigan	5,179
Grand River above mouth, Michigan	5,572
Grand Encampment Creek at Peryam's ranch, near Encampment, Wyoming	252
Grassy Creek (tributary of Nolichucky River) near Sprucepine, North Carolina	12
Great Basin in California	47,240
Great Basin in Idaho	3,420
Great Basin in Nevada	102,220
Great Basin in Oregon	18,950
Great Basin in Utah	43,548
Great Basin in Wyoming	1,494
	<hr/>
	216,872
Great Lakes:	
Superior	80,400
Michigan	68,100
Huron	75,300
St. Clair	6,815
Erie	34,480
Ontario	32,980
	<hr/>
	298,075
Great Salt Lake, Utah	2,280
Green River (tributary of Broad River) at Cox's bridge, North Carolina	200

	Square miles.
Green River (tributary of Broad River) near Saluda, North Carolina.....	51
Green River at Greenriver, Wyoming.....	7,450
Green River at Blake, Utah.....	38,200
Green River in Colorado.....	10,332
Green River in Utah.....	15,916
Green River in Wyoming.....	20,977
	<hr/> 47,225
Green River, Black Fork, at Granger, Wyoming.....	2,400
Greenbrier River at Alderson, West Virginia.....	1,344
Greenbrier River at mouth, West Virginia.....	1,575
Grey Bull River at Meteetse, Wyoming.....	870
Grose Creek (tributary of Holston River) at mouth, Virginia.....	3
Gunnison River at Iola, Colorado.....	2,298
Gunnison River at Grand Junction, Colorado.....	7,935
Gunpowder River at Baltimore conduit, Maryland.....	294
Halls Creek (tributary of Holston River) at mouth, Virginia.....	14
Haw River at Moncure, North Carolina.....	1,800
Hemlock Lake (tributary of Genesee River) at outlet, New York.....	43
Henry Fork 1 mile above mouth of Fall River, Idaho.....	931
Henson Creek (tributary of Nolichucky River) at mouth, North Carolina.....	7
Hickorynut Creek (tributary of Broad River) at mouth, North Carolina.....	8
Higgins Lake, Michigan (water surface 15 square miles).....	67
Hillabee Creek at Alexander City, Alabama.....	214
Hiwassee River at Murphy, North Carolina.....	410
Hiwassee River at Reliance, Tennessee.....	1,180
Hiwassee River at Charleston, Tennessee.....	2,297
Hiwassee River at mouth, Tennessee.....	2,698
Hogthief Creek (tributary of Holston River) at mouth, Virginia.....	6
Hogtrough Creek (tributary of Holston River) at mouth, Virginia.....	6
Hollow Poplar Creek (tributary of Nolichucky River) at ford on Erwin-Bakersville road, North Carolina.....	9
Holston River, South Fork, below mouth of Middle Fork, Virginia.....	582
Holston River, South Fork, at Bluff City, Tennessee.....	828
Holston River, South Fork, below mouth of Laurel Fork, Virginia.....	336
Holston River, South Fork, above mouth of Laurel Fork, Virginia.....	160
Holston River, South Fork, at Rye Valley, Virginia.....	37
Holston River, Middle Fork, 5 miles above mouth at Shallow Ford, Virginia.....	227
Holston River, Middle Fork, above mouth of Bear Creek, Virginia, near Marion, Virginia.....	33
Holston River at mouth, Tennessee.....	3,790
Hominy Creek (tributary of French Broad River) at Asheville, North Carolina.....	104
Honeoye Creek (tributary of Genesee River) at mouth, New York.....	263
Hood River at Tucker, Oregon.....	350
Hood River at mouth, Oregon.....	418
Hoosic River (tributary of Hudson River) at mouth, New York.....	730
Horse Creek (tributary of New River) one-fourth mile above mouth, North Carolina.....	56
Horse Creek (tributary of Nolichucky River) at mouth, North Carolina.....	6
Houghton Lake, Michigan (water surface 31 square miles).....	185
Hubbard Lake, Michigan (water surface 134 square miles).....	148
Hudson River at Glens Falls, New York.....	2,800
Hudson River at Mechanicsville, New York.....	4,500

	Square miles.
Hudson River at Troy, New York	8,000
Hudson River at Hadley, New York	1,092
Humboldt River at Elko, Nevada	2,840
Humboldt River at Battle Mountain, Nevada	7,800
Humboldt River at Golconda, Nevada	10,780
Humboldt River at Oreana, Nevada	13,800
Humboldt River at Oreana, Nevada, including Grassy Valley	14,967
Humboldt River, North Fork, at Peko, Nevada	1,020
Humboldt River, South Fork, at Mason's ranch, Nevada	1,150
Hungry Mother Creek (tributary of Holston River) at ford near Marion, Virginia	16
Huron River at mouth, Michigan	950
Huttons Branch (tributary of Holston River) at mouth, Virginia	14
Independence Creek (tributary of Black River) at mouth, New York	90
Indian Lake at gaging station, New York	146
Jack Creek (tributary of Nolichucky River) at mouth, North Carolina	22
James River at Buchanan, Virginia	2,058
James River at Balcony Falls, Virginia	3,027
James River at Cartersville, Virginia	6,232
Jarrett Creek (tributary of Catawba River) near mouth, North Carolina	6
Jefferson River at Sappington, Montana	8,984
Jefferson River at Threeforks, Montana	9,400
Jim Scott Branch (tributary of Holston River) at mouth, Virginia	2
Johns River (tributary of Catawba River) on highway bridge near Mor- gantown, North Carolina	213
Johns River (tributary of Catawba River) at Collettsville, North Carolina	70
Jones Falls at Baltimore conduit, Maryland	38
Juniata River at Newport, Pennsylvania	3,476
Juniata River at mouth, Pennsylvania	3,530
Kalamazoo River, North Branch, at Albion, Michigan	138
Kalamazoo River, South Branch, at Albion, Michigan	136
Kalamazoo River at Marengo dam, Michigan	261
Kalamazoo River below junction of North and South branches	274
Kalamazoo River at Marshall, Michigan	443
Kalamazoo River above Battlecreek, Michigan	603
Kalamazoo River below Battlecreek, Michigan	847
Kalamazoo River at Plainville, Michigan	1,307
Kalamazoo River at Allegan, Michigan	1,508
Kalamazoo River at mouth, Michigan	2,064
Kalawa River. <i>See</i> Calowa River.	
Kansas River at Lecompton, Kansas	58,550
Kansas River at Lawrence, Kansas	59,841
Kansas River in Kansas	34,526
Kansas River in Nebraska	17,455
Kansas River in Colorado	9,459
	61,440
Kaweah River above sec. 3, T. 18 S., R. 27 E., California	619
Kennebec River at outlet of Moosehead Lake, Maine	1,250
Kennebec River below mouth of Dead River, Maine	2,570
Kennebec River at Carritunk Falls, Maine	2,900
Kennebec River at Madison, Maine	3,330
Kennebec River at Norridgewock, Maine	4,030
Kennebec River at Somerset Mills, Maine	4,380
Kennebec River at Waterville, Maine, above mouth of Sebasticook River	4,410

	Square miles.
Kennebec River at Waterville, Maine, below mouth of Sebasticook River	5,470
Kennebec River at Augusta, Maine	5,770
Kennebec River at mouth, Maine	6,330
Kentucky Fork of North Toe River at mouth, North Carolina	4
Kern River at First Point of Measurement, above Bakersfield, California, including North Fork (1,115), South Fork (1,050), and Lower Basin (180)	2,345
Keuka Lake Outlet at foot of Keuka Lake, New York	187
Keuka Lake at outlet, New York	213
King Creek (tributary of French Broad River) on Brevard road, North Carolina	3
King River at Red Mountain, California	1,775
Knights Creek (tributary of Genesee River) at mouth, New York	22
Lake Creek at Twin Lakes, Colorado	109
Lake Creek at Interlaken station (between Twin Lakes), Colorado	104
Lake Erie	34,480
Lake Fork (tributary of Duchesne River) at mouth, Utah	475
Lake George at outlet, New York, including area of water surface (50)	238
Lake Huron	80,400
Lake Michigan	68,100
Lake Ontario	32,980
Lake St. Clair	6,815
Lake Superior	75,300
Laramie River above Woods Landing, Wyoming (in Colorado, 343)	435
Laramie River at Uva, Wyoming, including 428 square miles in Colorado	3,179
Laramie River at mouth, Fort Laramie, Wyoming, not including 500 square miles of lost drainage of James Lake, Cooper Lake, etc.	4,076
Laurel Creek (tributary of French Broad River) above mouth, North Carolina	136
Laurel Creek, Upper (tributary to Watauga River), at mouth, North Carolina	7
Laurel Creek, Lower (tributary of Watauga River), at mouth, North Carolina	7
Laurel Fork of Doe River at Allentown, Tennessee	26
Laurel Fork of Holston River 1 mile below Damascus, Virginia	172
Lees Creek (tributary of French Broad River) at Olivette, North Carolina	5
Linville River at Linville Falls, North Carolina	46
Linville River at mouth, North Carolina	87
Little River (tributary of French Broad River) at bridge three-fourths mile above mouth, North Carolina	59
Little River (tributary of New River) at ford on Independence-Oldtown road, Virginia	134
Little Androscoggin River at mouth, Maine	380
Little Bald Mountain Creek at mouth, North Carolina	3
Little Crabtree Creek (tributary of Nolichucky River) above lower ford on Micaville-Sprucepine road, North Carolina	19
Little Delaware Creek (tributary of Delaware River) near mouth, New York	53
Little Doe River (tributary of Watauga River) at Allentown, Tennessee	31
Little Goose Creek at Sheridan, Wyoming	128
Little Patuxent River at mouth, Maryland	139

Square miles.

Little Pine Creek (tributary of French Broad River) above mouth, North Carolina	15
Littlerock Creek at head of South Antelope Valley Irrigation Company's canal, near Palmdale, California	78
Little Tennessee River at Judson, North Carolina	682
Little Truckee River at Boca, California	171
Little Wood River at Toponis, Idaho	1, 270
Locust Creek (tributary of Nolichucky River) at mouth, North Carolina	6
Logan River at Logan, Utah	218
Lookingglass River (tributary of Grand River) at mouth, Michigan	306
Los Angeles River above Devils Gate reservoir site, California	28
Los Angeles River above Narrows at Burbank, California, including Tujunga Canyon (116), Arroyo Seco Canyon (18.1), Millard Canyon (3.1), Eaton Canyon (6.5), Little Santa Anita Canyon (2.5), and Santa Anita Canyon (11.1)	470
Los Pinos River at north line of Southern Ute Indian Reservation, Colorado	321
Los Pinos River at Ignacio Agency, Colorado	450
Los Pinos River at mouth, Colorado	650
Loup River at Columbus, Nebraska	13, 542
Lovell Creek (tributary of Black River) at mouth, New York	34
Lower Creek (tributary of Catawba River) near Morganton, North Carolina	87
Lower Black Creek (tributary of Genesee River) at mouth, New York	212
Lower Laurel Creek (tributary of Watauga River) at mouth, North Carolina	7
Madison Brook (tributary of Chenango River) at mouth, New York	9
Madison River at Redbluff, Montana	2, 085
Madison River at Threeforks, Montana	2, 420
Magalloway River at mouth, Maine	420
Malade River at Toponis, Idaho	2, 190
Malade River at Bliss, Idaho	3, 550
Malheur River at Vale, Oregon	9, 900
Mancos River at Mancos, Colorado	117
Mancos River at mouth, Colorado	855
Manti Creek at Manti, Utah	31
Maple Creek (tributary of Broad River) on bridge near mouth, North Carolina	13
Maple River above Maple Rapids, Michigan	459
Maple River at mouth, Michigan	919
Martin Creek (tributary of Nolichucky River) near Erwin, Tennessee	6
Martins Creek (tributary of Black River) at mouth, New York	29
Mattawamkeag River below outlet of Baskahegan Lake, Maine	190
Mattawamkeag River at mouth, Maine	1, 530
Meat Camp Creek (tributary of New River) one-fourth mile below Moretz, North Carolina	19
Medicine River at Kiowa, Kansas	1, 300
Merced River at Merced Falls, California	1, 076
Merrimac River at Lawrence, Massachusetts	4, 553
Messalonskee River at mouth, Maine	205
Middle Branch of any river, <i>see</i> the river.	
Middle Creek near Bozeman, Montana	55
Middle Creek (tributary of Nolichucky River) at ford on Micaville-Marion road, North Carolina	2

Square miles.

Middle Fork of any river, <i>see</i> the river.	
Middle Loup River at St. Paul, Nebraska	6,849
Middle Saluda Creek 1 mile above mouth, North Carolina	54
Milk River at Havre, Montana, including Bad Water Lake	7,300
Mill Creek at Crafton, California	47
Mill Creek (tributary of Holston River) 1 mile above mouth, Virginia	7
Mill Creek (tributary of Catawba River) near mouth, North Carolina	16
Mills River (tributary of French Broad River) on Old Haywood road, North Carolina	73
Mississippi River at St. Paul, Minnesota, including Minnesota River (16,350)	36,085
Missoula River at Missoula, Montana	5,960
Missouri River at Townsend, Montana	14,500
Missouri River at Canyon Ferry, Montana	15,036
Missouri River at Craig, Montana	17,615
Missouri River in Montana	81,018
Missouri River in Wyoming	760
	81,778
Mitchell River (tributary of Yadkin River) at railroad trestle, North Carolina	113
Mohave River at Victorville, California	400
Mohawk River at Ridge Mills, New York	153
Mohawk River at Rome, New York	184
Mohawk River at Utica, New York	524
Mohawk River at Little Falls, New York	1,306
Mohawk River below mouth of Schoharie Creek, New York	3,100
Mohawk River at Freeman's bridge, Schenectady, New York	3,212
Mohawk River at State dam, Rexford Flats, New York	3,385
Mohawk River at mouth, New York	3,468
Monocacy River at Frederick, Maryland	665
Monocacy River at mouth, Maryland	941
Monongahela River at Weston, West Virginia	140
Monongahela River at Fairmont, West Virginia	2,324
Monongahela River at Morgantown, West Virginia	2,749
Monongahela River at Greensboro, Pennsylvania	4,574
Monongahela River at Lock No. 4, Pennsylvania	5,427
Moody Mill Creek (tributary of Watauga River) at mouth, North Carolina	3
Moose River at outlet into Moosehead Lake, Maine	1,250
Moose River (tributary of Black River) at cable station, New York	346
Moose River (tributary of Black River) at mouth, New York	406
Mud Creek (tributary of French Broad River) at road crossing near mouth, North Carolina	116
Mud Creek (tributary of Clyde River) at Lyons, New York	298
Muddy Creek (tributary of Catawba River) near mouth, North Carolina	67
Mulberry Creek (tributary of Johns River) at Collettsville, North Carolina	32
Mulberry Creek (tributary of New River) at mouth, North Carolina	35
Mulberry River (tributary of Yadkin River) at railroad trestle, North Carolina	44
Muskegon River above Clam River, Michigan	787
Muskegon River below Clam River, Michigan	1,094
Muskegon River above Big Rapids, Michigan	1,764

	miles.
Muskegon River above Newaygo, Michigan	2, 352
Muskegon River above mouth, Michigan	2, 663
Muskingum River at Zanesville, Ohio	5, 828
Muskrat Lake and group, Michigan (water surface 8 square miles)	57
Nantahala River at mouth, North Carolina	193
Naches River at North Yakima, Washington	1, 000
Neatahwanta Lake at outlet, New York	23
Neosho River at Iola, Kansas	3, 670
Neshaminy Creek below the forks, Pennsylvania	139
Neuse River at Selma, North Carolina	1, 175
Neversink River (tributary of Delaware River) near mouth, New York	346
Newfound Creek (tributary of French Broad River) three-fourths mile above mouth, North Carolina	33
Newfound Creek (tributary of French Broad River) at mouth, North Carolina	34
New River, North Fork, at Weaversford, North Carolina	278
New River, North Fork, 1 mile below Creston, North Carolina	65
New River, South Fork, at New River, North Carolina	327
New River, South Fork, at Riverside, North Carolina	102
New River, East Fork, at ford on Boone-Aho road, North Carolina	6
New River, Middle Fork, at ford on Boone-Aho road, North Carolina	14
New River at Oldtown, Virginia	1, 100
New River at Radford, Virginia	2, 725
New River above Greenbrier River, West Virginia	4, 523
New River at Hinton, West Virginia	5, 600
New River at Fayette, West Virginia	6, 200
Ninemile Creek 1 mile below Stittville, New York, gaging station	63
Ninemile Creek at mouth, New York	74
Niobrara River at Fort Niobrara, Nebraska	6, 300
Nolichucky River above Tennessee State line	640
Nolichucky River at Chuckey Valley, Tennessee	817
North (of James) River at East Glasgow, Virginia	831
North Boulder Creek near Boulder, Colorado	102
North Branch of any river, <i>see</i> the river.	
North Broad River at Carlton, Georgia	763
North Fork of any river, <i>see</i> the river.	
North Indian Creek (tributary of Nolichucky River) at Erwin, Tennessee	61
North Loup River at St. Paul, Nebraska	4, 024
North Platte River above Sweetwater River, including 1,696 in Colorado	7, 668
North Platte River above Douglas, Wyoming	14, 255
North Platte River above Orin Junction, Wyoming	14, 828
North Platte River at Guernsey, Wyoming	16, 243
North Platte River above Fort Laramie, Wyoming	16, 416
North Platte River below Laramie River, Wyoming	20, 492
North Platte River in Wyoming and Colorado	23, 643
North Platte River at Gering, Nebraska	24, 340
North Platte River at Camp Clarke, Nebraska	24, 830
North Platte River at North Platte, Nebraska	28, 517
North Saluda Creek 2 miles below Humphrey's store, North Carolina	18
North Saluda Creek at ford on Lima-Cleveland Mills road, North Carolina	42
North Saluda Creek at iron bridge at Marietta, North Carolina	59
North Toe River (tributary of Nolichucky River) at Sprucepine, North Carolina	128

Square miles.

North Toe River (tributary of Nolichucky River) at ford on Linnville-Cranberry road, North Carolina	9
North Toe River, Kentucky Fork of, at mouth, North Carolina	4
Nottely River at Ranger, North Carolina	272
Oak Creek (tributary of Susquehanna River) at mouth, New York	115
Oalout Creek (tributary of Susquehanna River) at mouth, New York	115
Oatka Creek at Warsaw, New York	28
Ocmulgee River at Macon, Georgia	2, 425
Oconee River at Carey, Georgia	1, 346
Oconee River at Dublin, Georgia	4, 182
Octoraro Creek at mouth, Rowlandsville, Maryland	217
Ogden River at Powder Mills, near Ogden, Utah	360
Oldfield Creek (tributary of New River) near mouth, North Carolina	13
Olentangy River at Galion, Ohio	29
Olentangy River at mouth, Columbus, Ohio	532
Oneida Creek (tributary of Oneida River) at Kenwood, New York	59
Oneida Creek (tributary of Oneida River) at mouth, New York	149
Oneida Lake at outlet, New York	1, 300
Oneida River at mouth, New York	1, 402
Oostanaula River at Resaca, Georgia	1, 614
Oostanaula River at mouth, Rome, Georgia	2, 152
Oriskany Creek at State dam, Oriskany, New York	144
Oriskany Creek at Coleman, New York	141
Oriskany Creek at mouth, New York	146
Oswego River below Three River Point, New York	167
Oswego River below junction of Seneca and Oneida rivers, New York	4, 868
Oswego River at Fulton, New York	4, 916
Oswego River at gaging station, New York	4, 990
Oswego River at high dam near Oswego, New York	5, 000
Oswego River at mouth, New York	5, 002
Otego Creek (tributary of Susquehanna River) at mouth, New York	106
Otisco Lake at outlet, New York	41
Otselic River (tributary of Susquehanna River) at mouth, New York	259
Otter Creek (tributary of Black River) at mouth, New York	60
Onondaga Lake at outlet, New York	267
Oquago Creek, New York. <i>See</i> Coquago Creek.	
Owasco Outlet at Owasco Inlet, New York	120
Owasco Outlet at foot of Owasco Lake, New York	208
Owasco Outlet at Auburn, New York	212
Owasco Outlet at mouth, New York	230
Owego Creek (tributary of Susquehanna River) at mouth, New York	391
Owyhee River at Owyhee, near Ontario, Oregon	9, 875
Paddys Creek (tributary of Catawba River) near mouth, North Carolina	13
Palouse River at Hooper, Washington	2, 210
Palouse River below mouth of Cow Creek, Washington	2, 460
Passadumkeag River at mouth, Maine	400
Patapsco River, South Branch, Maryland	84
Patapsco River, North Branch, Maryland	166
Patapsco River at Woodstock, Maryland	251
Patapsco River above Patapsco Station, Maryland	361
Patuxent River above mouth of Little Patuxent River, Maryland	194
Patuxent River at Laurel, Maryland	137
Patuxent River below junction of West Branch	515

Square miles.

Pawpaw Creek (tributary of French Broad River) 1 mile above mouth, North Carolina	4
Pawpaw River (tributary of St. Joseph River) at mouth, Michigan	429
Payette River at Payette, Idaho	3,565
Peach Bottom Creek (tributary of New River) above mouth, Virginia	28
Penobscot River opposite extremity of Moosehead Lake, below mouth of Nulhedus Creek, Maine	600
Penobscot River at entrance to Chesuncook Lake, Maine	870
Penobscot River at outlet of Chesuncook Lake, Maine	1,440
Penobscot River at outlet of Twin Lakes, Maine	1,990
Penobscot River below mouth of East Branch, Maine	3,160
Penobscot River below mouth of Piscataquis River, Maine	6,590
Penobscot River at Oldtown, Maine	7,240
Penobscot River at Bangor, Maine	7,910
Penobscot River at mouth, Maine	8,550
Penobscot River, East Branch, at mouth, Maine	1,170
Pepacton River (tributary of Delaware River) at mouth, New York	919
Perkiomen Creek at Frederick, Pennsylvania	152
Phillips Creek (tributary of Genesee River) at mouth, New York	32
Piedra River at Arboles, Colorado	670
Pigeon Creek (tributary of Nolichucky River) at mouth, North Carolina	5
Pigeon Roost Creek (tributary of Nolichucky River) at mouth, North Carolina	11
Pigeon River at Newport, Tennessee	655
Piscataquis River at Dover, Maine	380
Piscataquis River below outlet of Sebec Lake, Maine	750
Piscataquis River at mouth, Maine	1,500
Platte River at North Platte, Nebraska:	
North Platte River	28,517
South Platte River	23,294
	51,811
Platte River at Columbus, Nebraska	56,867
Platte River, North and South, in Colorado	22,230
Platte River, North and South, in Nebraska	10,850
Platte River, North and South, in Wyoming	24,240
	57,320
Platte River, South Fork, at Lake Cheesman, Colorado	1,677
Plum Tree Creek (tributary of Nolichucky River) at mouth, North Carolina	6
Pomer Creek (tributary of Holston River) at mouth, Virginia	13
Portage River (tributary of St. Joseph River) at mouth, Michigan	178
Portneuf River at McCammon, Idaho	500
Portneuf River at Pocatello, Idaho	1,130
Potomac River, North Branch, above Bloomington, Maryland	293
Potomac River, North Branch, at Piedmont, West Virginia, including Savage Creek (111)	409
Potomac River, North Branch, at Cumberland, Maryland, including New Creek at mouth, Keyser, West Virginia (56)	891
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Potomac River, South Branch, at junction with North Fork, including 188 square miles at Franklin	318

	Square miles.
Potomac River, South Branch, including North Fork below Seneca Creek (240) and at mouth (322)	640
Potomac River, South Branch, at Moorefield, West Virginia, including Mill Creek at mouth (101)	897
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Reddie Creek (tributary of Yadkin River) at North Wilkesboro, North Carolina	95
Red River in Texas	15,800
Red Rock Creek at Redrock, Montana	1,330
Republican River, North Fork, at Haigler, Nebraska	1,390
Republican River at Superior, Nebraska	22,347

	Square miles.
Republican River at Junction, Kansas	25, 837
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Republican River in Nebraska	10, 415
Republican River in Kansas	7, 496
	25, 837
Rice Creek at Marshall, Michigan, 1 mile above mouth	99
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Rio Grande at Cenicero, Colorado	7, 695
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	Square miles.
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	Square miles.
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	Square miles.
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